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REPORT

OF THE

Board of State Engineers

OF THE

STATE OF LOUISIANA

BY

EDWARD M. CLEGG, E. C. HALL

GOVERNOR OF LOUISIANA

AND

FROM JANUARY ONE TO APRIL TWENTY, 1914

NEW ORLEANS, LA.
THE LOUISIANA ENGINEERING SOCIETY
1914

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R E P O R T

OF THE

Board of State Engineers

OF THE

STATE OF LOUISIANA

TO

HIS EXCELLENCY, LUTHER E. HALL

GOVERNOR OF LOUISIANA

FROM

APRIL 20TH, 1912 TO APRIL 20TH, 1914

PRESS OF
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REPORT

OF THE

State Board of Engineers.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 20, 1914.

To His Excellency, Luther E. Hall, Governor of Louisiana:

Sir—The Board of State Engineers has the honor to submit, for your Excellency's information, the following report, with accompanying appendices, covering the period from April 20, 1912, to April 20, 1914.

DUTIES AND PERSONNEL OF THE BOARD.

The Board of State Engineers was created by Act 33, approved February 10, 1879. The duties of the Board, as defined by this Act, are to make surveys of water courses, public works and levees of the State; to "report to the Governor of the State the improvements necessary and levees to be constructed, which are of prime importance to the State at large;" to furnish estimates and specifications of the work so required; to examine and measure the work recommended by the Board, and done under contracts made by the State, and to specify the amount of payments due for the work thus executed.

Under the provisions of later laws, the Board has been constituted, in general terms, the engineers and advisers of the following named Boards of Levee Commissioners so far organized in the State, viz:

1. The Tensas Basin Levee District. Act 26 of 1884. Amended by Acts 59 of 1886; 77 of 1888; 103 of 1902; 70 of 1894; 117 of 1898; 20 of 1900; 311 of 1908, and 141 of 1910.

2. The Fifth Louisiana Levee District. Act 44 of 1886. Amended by Acts 16 of 1890, and of 1892; 48 of 1894; 11 of 1898; 5 and 6 of 1902; 51 of 1904; 188 of 1910, and 134 of 1912.

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3. The Red River, Atchafalaya and Bayou Boeuf Levee District. Act 79 of 1890. Amended by Acts 46 of 1892; 62 of 1894, and 49 of 1900.

4. The Pontchartrain Levee District. Act 95 of 1890. Amended by Acts 68 of 1892; 59 and 96 of 1894; 90 of 1900; 4 of 1904, and 74 of 1910.

5. The Atchafalaya Basin Levee District. Act 97 of 1890. Amended by Acts 140 of 1902; 45 of 1906; 253 of 1908, and 221 of 1910.

6. The Lafourche Basin Levee District. Act 13 of 1892. Amended by Acts 100 of 1892; 19 and 175 of 1894; 55 and 116 of 1904; 119 of 1906.

7. The Lake Borgne Levee District. Act 14 of 1892. Amended by Act 4 of 1906.

8. The Caddo Levee District. Act 74 of 1892. Amended by Acts 90 of 1894; 142 and 160 of 1900; 268 of 1908, and 168 of 1910.

9. The Bossier Levee District. Act 89 of 1892. Amended by Acts 104 of 1894; 28 of 1904, and 248 of 1910.

10. The Buras Levee District. Act 18 of 1894. Amended by Acts 80 and 97 of 1898, and 205 of 1910.

11. The Cat Island Levee District. Act 110 of 1894.

12. The Grand Prairie Levee District. Act 24 of 1898. Amended by Acts 41 and 43 of 1900, and 16 and 18 of 1902.

13. The Plaquemines Parish East Bank Levee District. Act 7 of 1902. Amended by Acts 116 of 1902; 11 of 1904, and 41 of 1910.

14. The Red River and Bayou des Glaizes Levee and Drainage District. Act 109 of 1904.

15. The Saline Levee and Drainage District. Act 80 of 1906. Amended by Act 206 of 1912.

16. The North Bossier Levee District. Act 138 of 1906.

17. The Orleans Levee District. Act 93 of 1890. Amended by Acts 79 of 1892; 116 of 1898; 140 and 145 of 1900, and 251 of 1912.

The only direct reference to the Board of State Engineers occurs first in Act 93 of 1890, as follows:

"Section C. Be it enacted, etc., That the said Board of Levee Commissioners, as to location, construction and repairs of all levees necessary to protect said district; shall first have the approval in writing of the Board of State Engineers."

Later on, by Acts 79 of 1892, and 140 of 1900, the Board of Commissioners of the Orleans Levee District was required to have the approval in writing of the Board of State Engineers, as to location, construction and repairs of levees "on the river front of said district," only.

In addition to the foregoing, a number of general laws are in force, specially calling for, or imposing other duties upon, either the Board of State Engineers, as a whole, or the Chief State Engineer, as the head of the Department.

In fact, with each recurring session of the General Assembly of the State, the field operations of the Board of State Engineers are materially enlarged, and the duties required of its members and its corps of employes greatly increased.

In addition to the general administration of the affairs of the Department, as specified by law and passed into practice by precedent, the Board of State Engineers has, during this period, been called into service on a number of occasions in the matters of information, advice and direction by your Excellency, by the United States, many of the Police Juries of the State, drainage and reclamation districts, and other public bodies, involving, in a number of instances, extended inspections, surveys and other engineering work.

In this way, the constant care and attention of the members of the Board of State Engineers has been necessary during the entire time covered by this report, and, in addition to the office force proper, has required the regular employment of a number of instrument men, and, from time to time, of an equal number of rodmen, as assistants in the field. On occasions, too, the employment of men in other capacities, both in the field and in the office, was demanded.

With direct reference to the members of the Board of State Engineers, themselves, their attention has, as has been usual in the past, been directed to the affairs of all the levee districts, and

to special duties in any one of them, as occasion demanded. As a matter of system and convenience, however, the performance of the engineering work required in the levee districts, generally, has, during the past two years, devolved upon the members of the Board, as follows: In the Tensas Basin and Fifth Louisiana Levee Districts, upon Assistant State Engineer Marshall P. Robertson; in the Atchafalaya Basin and Pontchartrain Levee Districts, upon Assistant State Engineer Joseph W. Monget; in the Lafourche, Buras, Lake Borgne Basin, Grand Prairie, the Plaquemines Parish East Bank Levee Districts, and the Board of Control of the New Basin Canal and Shell Road, Orleans Parish, upon Assistant State Engineer John Klorer; and in the Caddo, North Bossier, Bossier, Red River, Atchafalaya and Bayou Boeuf, Red River and Bayou des Glaizes, and Saline Levee and Drainage Districts, upon Assistant State Engineer, Gervais Lombard.

The special engineering work and advices, required during the period of this report, by the Orleans Levee District, the Joint Organization of the Atchafalaya Basin and Lafourche Levee Districts, the Board of Control of the New Basin Canal and Shell Road, jointly with Assistant State Engineer John Klorer, the Board of Control of the Louisiana State Penitentiary, the Highway Department of the Board of State Engineers, Drainage and Reclamation work, together with attention to the general administration of affairs connected with public improvements in all parts of the State, and in the main office of the Department, has fallen generally to the Chief State Engineer, Frank M. Kerr.

LEEVE WORK FOR THE PAST TWO YEARS.

The contracts and agreements for levee work, undertaken during the past two years, by the State of Louisiana and the several Levee Districts of the State, with twenty-seven contracts entered into previous to April 20, 1912, and still in force at that date, numbered two hundred and forty, involving the handling of 16,607,836 cubic yards of earthwork, estimated to cost \$3,809,919.43.

The amount and cost of levee work actually performed under the contracts (not taking into consideration percentages retained until completion), between April 20, 1912 and April 20, 1914, by the State of Louisiana, and the Levee Districts of the State,

with that done by the United States, is shown in the following table:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The Levee Districts.....	44.01	114.99	13,407,190	\$3,070,173.95
The State of Louisiana.....	15.54	43.84	3,200,646	739,745.48
The United States.....	32.06	62.81	9,336,597	2,347,061.53
Aggregates.....	91.61	221.64	25,944,433	\$6,156,980.96

The foregoing, divided as to territory, is as follows:

LOCALITY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
IN ARKANSAS				
On the Arkansas River.....	0.25	3.66	371,996	\$ 151,242.84
On the Mississippi River.....	1.12	21.14	2,147,162	617,917.45
IN LOUISIANA				
On the Mississippi River.....	52.84	133.15	17,962,222	4,182,670.53
On the Red River.....	16.85	25.01	2,201,174	371,169.54
On the Atchafalaya River.....	11.27	35.24	2,974,809	784,493.75
On Bayou Rapides		0.76	22,442	3,815.14
On Bayou des Glaizes	6.40		181,195	21,146.28
On the Gulf Coast.....	0.31	2.68	31,521	6,412.48
Interior Streams.....	2.57		51,912	18,112.95
Aggregates.....	91.61	221.64	25,944,433	\$6,156,980.96

The amounts given do not include the work for the improvement of Bayou Lafourche, for navigation and the supply of fresh water,

undertaken by the Joint Organization of the Atchafalaya Basin Levee District and the Lafourche Levee District, on which some \$381,343.10 has been expended from inception to date.

In addition to the above, there still remains to be done, under contracts of the State and the several Levee Districts of the State, in force at this time, an amount of levee work estimated to aggregate not less than 3,250,758 cubic yards, and to cost not less than \$655,987.89.

Again, a considerable amount of work has, as usual, also been done in, and expenditures incurred by the several Levee Districts of the State, and by the United States for weed cutting, minor repairs, wooden revetments and for auxiliary works of various descriptions, information upon which to base exact statements in regard to all these particulars is not, in every instance, at hand, both the sum involved was, as usual, considerable.

Details relative to the locations, character, extent and cost of the levee work for the past two years will be found in the paragraphs of this Report appearing under the head of "The Levee Districts," and in tabular form in Appendix "A."

THE LEVEE SYSTEM.

The principal lines of continuous levee at present protecting the alluvial lands of Louisiana against overflow are as follows:

(1) From the high lands near Pine Bluff, Arkansas, down the right bank of the Arkansas River, to within about five miles of the mouth of the Old Arkansas River, a distance of some eighty-seven (87) miles, extending through the Linwood-Auburn District of Jefferson County, the Linwood-Auburn Levee District of Lincoln County, the Red Fork Levee District, and that part of the Desha Levee District above Arkansas City, some seventy-one and four-tenths (71.4) miles. At the lower end of this continuous line, an extension, some twenty-six (26) miles in length, running along Dry Bayou towards the main line of levee constituting the head of the Mississippi River Levees, has been constructed by the United States. This extension reduces the gap between the Mississippi and Arkansas River Levee Systems to about three and five-tenths (3.5) miles.

(2) From Costello's Gin, a point on Amos Bayou about five (5) miles South of Red Fork and about twelve (12) miles West

of the mouth of the Arkansas, a continuous line of levee extends down the left bank of Amos Bayou about five (5) miles; thence crossing Boggy Bayou to the right bank of Cypress Bayou, about one and five-tenths (1.5) miles; thence about six (6) miles down the right bank of Cypress Bayou to Lucca Landing, on the Mississippi River, where it joins the levee system on the right bank of the Mississippi River; and thence continues down through Desha and Chicot Counties, Arkansas, and the Fifth Louisiana Levee District to Point Breeze, Concordia Parish, Louisiana, about three hundred and ten and eight-tenths (310.8) miles below Lucca Landing, Arkansas, thus aggregating one continuous line of levee, from Costello's Gin, Arkansas, to Point Breeze, Louisiana, of about three hundred and twenty-three and three-tenths (323.3) miles.

(3) From Torras Landing, at the mouth of the Red River, (or, more properly, the mouth of Old River), the levee extends down the right bank of the Mississippi River, without break or interruption, to the outlet known as "The Jump"—that is, to within about ten (10) miles of the head of the Passes, a length of two hundred and eighty-eight and six-tenths (288.6) miles.

And from the same point at Torras Landing, the levee line runs along the South Bank of Old River five and five-tenths (5.5) miles to Barbres Landing; and thence down the left bank of the Atchafalaya River, to a point about sixteen and three-tenths (16.3) miles below East Melville, or two and one-tenth (2.1) miles below Bayou Alabama, making an aggregate length of line at this time from Torras Landing to the present terminus below Bayou Alabama of fifty-one and seven-tenths (51.7) miles.

(4) On the left bank of the Mississippi River the levee line extends uninterruptedly from Baton Rouge to what is known as Lucas Canal, about six and no-tenths (6.0) miles below Fort St. Phillip, a length of about two hundred and eighteen and seven-tenths (218.7) miles.

Up to 1909, the outlet through the left or East Bank of the river, known as Baptist Collette Gap, located about three (3) miles below Fort St. Phillip, remained open.

However, upon the strong representation of parties in interest, that the overflow through this gap or outlet was, even at normal stages of the river, causing serious and extended damage to con-

siderable acres of land, and to certain important and valuable interests, particularly the oyster interests, this gap was finally closed in 1909, provision, therefor, having been made jointly by the State, the Grand Prairie Levee District and what was at the time known as the Oyster Commission of Louisiana.

The line of levee thus built, including the dam proper across the outlet, and the wings along the upper and lower side of the outlet, is 6,541 feet in length, or one and two-tenths (1.2) miles, thus forming a detached local stretch of levee (in the Grand Prairie Levee District) of that length, in addition to the continuous line in the District of thirty-one and two-tenths (31.2) miles.

(5) The upper levee system of the Caddo Levee District, on the right or West Bank of Red River, extends from Blanton Bluff, Arkansas, about three-quarters ($\frac{3}{4}$) of a mile above the Louisiana Line, to Twelve Mile Bayou, a length of line of about fifty and three-tenths (50.3) miles. Thence, from the lower side of Twelve Mile Bayou to Cross Bayou, about four and three-tenths (4.3) miles, the connection across and closing Twelve Mile Bayou being in abeyance, pending the adjustment of interests and conditions looking to the diversion of Twelve Mile Bayou, from Red River to Cross Bayou, and by way of the latter to Red River again, at a point some five and one-quarter ($5\frac{1}{4}$) miles below that at which it now enters Red River.

(6) The lower levee system of the Caddo Levee District, also on the right or West Bank of Red River, extends from the Bluffs, on the North side of Bayou Pierre, to near the lower limits of Caddo Parish, a length of line of about thirty-four and four-tenths (34.4) miles.

(7) The levees of the Bossier Levee District, on the left bank of Red River, extend from the highlands opposite Old Benton, Louisiana, to the Old Dennison Plantation, a length of about forty-eight and no-tenths (48.0) miles.

Below this, the natural banks of Red River, in Bossier Parish, are, except at Ninock and Swift Chute Bayous, generally high enough, as compared with the high waters of the past, to restrain all but very extreme floods, occurring, in the light of history, at long intervals of time. Both of these streams are closed by levees.

(8) Along the South Bank of Loggy Bayou, in the Parish of Red River, there exists an aggregate of zero and nine-tenths (0.9)

miles of public levee, in the form of ten dikes, closing as many sloughs and depressions, formerly permitting escape from Loggy Bayou, in time of flood in Red River, and overflowing considerable territory below, much in advance of the bankfull stages of Red River and Loggy Bayou, which are generally superior in elevation to most high waters in Red River. These dikes were constructed by the State in 1911.

(9) The upper system of the Red River, Atchafalaya and Bayou Boeuf Levee District, is continuous from a point on the South Bank of Bayou Rapides, on the Cooper Place, about seven and six-tenths (7.6) miles above Alexandria, to its junction with Red River, at the latter point; thence down the right bank of Red River to the Avoyelles Prairies at David's or Moncla's Ferry, thirty-five and three-tenths (35.3) miles in length, or a total for the upper system of forty-two and nine-tenths (42.9) miles.

(10) The lower levee system of the Red River, Atchafalaya and Bayou Boeuf Levee District is continuous on the right bank of Bayou des Glaizes, from the "Junction," a point about nine (9) miles above Moreauville, down the Bayou to its junction with the Atchafalaya River, at Simmsport, about forty-eight and no-tenths (48.0) miles; and thence down the right or West Bank of the Atchafalaya River to a point about fourteen and five-tenths (14.5) miles below Melville, or about one-quarter ($\frac{1}{4}$) mile below Bayou Bigraw. The total mileage for the entire District is, at this time, about one hundred and thirty and seven-tenths (130.7) miles.

(11) The levee system of the Red River and Bayou des Glaizes Levee and Drainage District, will, when completed, comprehend a length aggregating probably one hundred and twenty-five (125) miles, of which, however, only twenty-seven and two-tenths (27.2) miles have so far been built, extending from the Avoyelles Prairies at David's or Moncla's Ferry to a point about five and four-tenths (5.4) miles below Lake Long. A breach, however, occurred in the line at Long Lake in 1912, which has not since been closed, leaving an isolated stretch of levee below, some five and four-tenths (5.4) miles in length.

(12) The levee system contemplated for the Saline Levee and Drainage District aggregated about seventeen and five-tenths

(17.5) miles in length. Of this, however, but ten and three-tenths (10.3) miles, extending from Cassandria to and across Coco Point, have so far been completed.

(13) The levee system of the Plaquemines Parish East Bank Levee District excludes the overflow waters of the Gulf of Mexico from that portion of the Parish of Plaquemines included in the Lake Borgne Basin and Grand Prairie Districts, extending from the upper line of Harlem Plantation to the upper bank of Cusilich Canal, on the property of Peter Cusilich, below the site of the old Quarantine Station, a distance by the levee line of about thirty-two and three-tenths (32.3) miles. In addition to this, there are cross levees at Harlem, Bohemia, Nestor Canal (both sides), Bayou Lamoque (both sides), and Cusilich Canal, aggregating about four (4) miles.

The aggregate length of levee lines thus generally described is one thousand three hundred and five and four-tenths (1305.4) miles. In addition to these, there are a number of lengths of levee lines in comparatively isolated localities, and on interior streams, some parts of which are not located in any regular Levee District, amounting to about three hundred and forty-seven and six-tenths (347.6) miles, making a total length of levee lines more or less protecting Louisiana, at this time, of one thousand six hundred and fifty-three and no-tenths (1653.0) miles; that is, one hundred and fifty-six and four-tenths (156.4) miles in the State of Arkansas and one thousand four hundred and ninety-six and six-tenths (1496.6) miles in Louisiana, divided according to territory and streams, as follows, viz:

REVISED LENGTHS OF LEVEE LINES IN LOUISIANA AND THAT PART
OF ARKANSAS AIDING IN THE PROTECTION OF LOUISIANA.

APRIL 20, 1914.

NAME OF STATE DISTRICTS	Miles on Mississippi River	Miles on Red River	Miles on Atchafalaya River	Miles on Bayou Lafourche	Miles on Other Streams	Total Miles By Districts
Tensas Basin.....					(a) 40.0	40.0
Fifth Louisiana.....	240.9				(b) 39.0	279.9
Atchafalaya Basin.....	127.2		46.2	(c) 75.0		248.4
Pontchartrain.....	125.8				(d) 0.3	126.1
Lafourche.....	119.5			(e) 74.1		193.6
Orleans.....	25.7				(f) 51.6	77.3
Lake Borgne.....	49.3					49.3
Grand Prairie.....	31.2				(o) 1.2	32.4
Plaquemines Parish, East Bank.....					(g) 36.3	36.3
Buras.....	33.7					33.7
Caddo.....		89.0			(h) 9.0	98.0
Bossier.....		48.0				48.0
Red River, Atchafalaya and Bayou Boeuf.....		35.3	39.8		(i) 55.6	130.7
Red River and Bayou des Glaizes.....		27.2				27.2
Saline.....		10.3				10.3
North Bossier (j).....						
Cat Island.....	(k) 12.8					12.8
State of Arkansas aid- ing in the protection of Louisiana.....	69.9				(l) 86.5	156.4
Outside of Levee Dis- tricts.....	(m) 13.1	(n) 35.9				49.0
Totals.....	849.1	249.3	86.0	149.1	319.5	1,653.0

(a) Includes 10.5 miles on Ouachita River, 17 miles on Black River and 13 miles on Little River.

(b) Includes 12.7 miles on Ouachita River and 26.3 miles on Tensas River.

(c and e) These systems, due to closure of Bayou at head, pending construction of lock, in disuse at this time, also since closure of Bayou Lafourche, cut thorough in many places for easy access to Bayou for connecting canals. Not more than 65% remaining at former grade and section.

(d) Includes 0.3 miles of cross levee at head of system.

(f) Rear levees, etc.

(g) Along Gulf Coast, Parish of Plaquemines, East Bank, includes 7 cross levees.

(h) All on Bayou Pierre in disuse since closure of Tones Bayou.

- (i) Includes 7.6 miles on Bayou Rapides and 48 miles on Bayou des Glaizes.
- (j) System not yet begun.
- (k) Fragmentary, built before organization of District. District not in operation.
- (l) Includes 71.4 miles on Arkansas River, from Pine Bluff, Arkansas, to lower end of Arkansas River System, also 2.6 miles extension of Arkansas River Levee System towards Cypress Bayou, and 12.5 miles on Amos Bayou and Cypress Bayou above head of System on Mississippi River.
- (m) Around Angola State Farm.
- (n) Including Loggy Bayou, new levee 0.9 miles. Murrell new levee 0.4 miles, Westdale 0.9 miles, Grand Bend 0.6 miles, and 33.1 miles of fragmentary lengths of levee lines on Red River.
- (o) Detached line of levee closing Bayou Baptiste Collette.

THE CONSTRUCTION OF LEVEES.

In the construction of levees in Louisiana, and that part of Arkansas affecting Louisiana, undertaken by the State and Levee Districts of the State, the following general specifications, quoted from the "General Specifications and Conditions," usually maintain, viz:

"3rd. The Contractor assumes all risks from subsidence in foundation, or base, accidents, floods and casualties of every kind which may occur before the completion and acceptance of the work, and shall sustain all damages and injury that may be caused thereby.

"4th. No part of the work herein contracted for shall be given sold, or assigned to a sub-contractor without the consent of the President of this Board, expressed in writing; nor shall said Contractor or his sureties be released from personal and immediate responsibility without like consent.

"5th. The embankment shall be built of such material, and disposed and distributed in such manner as the Engineer in charge may direct, under the requirements of the Board of State Engineers. The required allowance for shrinkage shall be added to the height of the embankment; this allowance to be at the discretion of the Engineer in charge, up to one-fifth in excess of the net height of the embankment; it being understood that a cubic yard of embankment under this agreement is a net cubic yard of settled earth, and equal to five-sixths of a cubic yard of material in place, within the limits prescribed.

"6th. The Contractor shall remove all trees, stumps, logs, roots, stalks, weeds, grass, trash and perishable matter of every kind not especially exempted from this requirement by the instructions from the Engineer in charge, and plow or spade up the ground over the entire surface to be covered by the embankment. He shall grub up by the roots all trees and stumps within the limits of the base of the embankment, and five feet on either side of the base. He shall remove all buried logs, brick or walls and other material considered unsuitable by the Engineer in charge. He shall refill all holes made by grubbing or by the removal of unsuitable materials, as aforesaid, with solid earth up to the level of the natural surface of the ground, and the refilling of such holes shall not be paid for by the cubic yard (except in special cases, when so directed by the Engineer in charge), but shall be considered as a part of the clearing and grubbing to be done as incidental or auxiliary work, payment for which shall be included in the price per cubic yard of embankment hereinafter stipulated. He shall carefully clean all ditches crossing the line of embankment, and fill them with solid earth up to the level of the natural surface of the ground, for a distance of twenty (20) feet from the base of the embankment on the land side, and for the width of the berme prescribed on the river side. He shall cut muck ditches of such depth and size as may be prescribed by the Engineer in charge. If required by the Engineer in charge, the clearing, grubbing, preparation of base and cutting of muck ditch, as above, shall be completed, and the muck ditch refilled throughout the whole length of the embankment, or any part thereof, before the embankment be begun. In the construction of the embankment he shall, except where other material may be ordered by the Engineer in charge, use earth only, and shall place it in layers of such thickness as may be directed by the Engineer in charge, and extending the full width of the embankment. Except when otherwise granted permission in writing by the Engineer in charge, he shall obtain all earth from the river side of the embankment, leaving a berme of the natural surface of the ground feet wide between the base of the embankment and the borrow pits. Unless otherwise directed by the Engineer in charge, all borrow pits shall be sloped on the side nearest the embankment not steeper than three (3) horizontal to one (1)

vertical, and on that side shall not be deeper than five (5) feet, from which point the bottom of the pit may slope away from the berme on a slope not steeper than five (5) feet vertical in one hundred (100) feet horizontal for one hundred (100) feet, at which point and beyond, the depth of the pit, for such width as may be required to supply material for the embankment, shall not exceed ten (10) feet below the natural surface of the ground. At intervals not greater than three hundred (300) feet, "traverses" of the natural surface of the ground, not less than twenty (20) feet wide with side slopes of two (2) to one (1), shall be left undisturbed, extending entirely across the pits, except that a ditch of such dimensions as may be directed by the Engineer in charge shall be cut through the "traverses," on the side of the pit next to the river, to allow drainage from one pit or part of pit to another. He shall plant the entire surface of the completed embankment with living roots or sods of Bermuda Grass, not more than one (1) foot apart, and to the satisfaction of the Engineer in charge. He shall cut down all trees, bushes and saplings for a width of one hundred (100) feet on each side of the embankment where it runs through woods or timber, and, in open land, he shall cut down such trees, etc., within one hundred (100) feet of the embankment as the Engineer in charge may direct. Unless otherwise directed, he shall cut all trees and stumps within twenty-five (25) feet of the base of the embankment on the land side, down to the level of the ground (but shall not disturb or destroy the Engineer's bench marks, or other reference points), and shall leave the ground clear of all fallen timber, brush or other debris or material obstructing free passage along the base of the embankment on the land for a width of twenty-five (25) feet. He shall take care to preserve the Engineer's stakes and bench marks, and shall at all times keep the station stakes at or opposite their proper location. If required by the Engineer in charge, he shall dig a drainage ditch on the land side of the embankment, of such dimensions and at such distance from the base as may be prescribed, but shall not otherwise break up the surface of the ground on the land side of the embankment, except by written permission of the Engineer in charge. He shall cut such openings through the old embankment or embankments as may be required by the Engineer in charge. When required by the Engineer in charge,

the earth taken from the openings made through the old embankment and from drainage ditches, shall be deposited in the embankment under construction, in which case it shall be paid for as embankment only, but otherwise it shall be measured and paid for in excavation. Except by special permission of the Engineer in charge, all existing embankments, or parts of old embankments, must be left undisturbed.

In addition to the foregoing, whenever practicable, the following specifications have, during the past two years, been prescribed:

"A side ditch or canal, for drainage, shall be required on the land side of the line of levee feet from the edge of the base of the levee, excavated to such dimensions and in such manner as may be prescribed by the Engineer in charge. The material (earth) excavated from said ditch or canal may be utilized in the construction of the levee, and when so utilized shall be paid for in embankment, but not otherwise. The ditch or canal shall be left free of all stumps, trees, logs, etc."

"All borrow pit areas shall be cleaned and grubbed to facilitate the observance of specifications governing the dimensions and shape of same."

The grade line usually observed by the levee authorities of the State, is that adopted and prescribed by the Mississippi River Commission.

In the matter of cross sections, slopes of 2 and 3 to 1; 3 and 2 to 1; $2\frac{1}{2}$ and $2\frac{1}{2}$ to 1; 3 and 3 to 1; 3 and 4 to 1, and 3 and 10 to 1, with width of crown varying from 4 to 50 feet, dependent upon location, height of levee, stability of bank, whether the bank requires protection by revetment or not, the availability of means, etc., are in practice.

By law, banquettes are required to be built over all Bayous or sloughs crossed by levees. Banquettes have also been generally prescribed across depressions of the ground in marked contrast with the general elevation of the natural surface in the vicinity of the levee; also where the general height of a levee exceeds 15 feet. Such banquettes are, as a rule, located along the land side of the line of levee, forming part of its land side base. A disposition, however, continues to gain favor to as much as possible avoid the construction of banquettes, and, in lieu thereof, adopt flatter slopes.

Where lines of levee are generally exposed to wave-wash, due to wind, the passage of steamers, etc., wooden revetments are, where practicable and the means available, built and maintained by the State and Levee Districts.

The United States also, when called upon to protect from wave-wash lines of levee built under its direction, on the "Lower Coast" (the Mississippi River below New Orleans) has, after considering various forms of protection, selected the paving of the entire river side slope of the levee with a layer of concrete.

Thus far, such paving as has been done presents a fine appearance, and is performing its offices satisfactorily.

The earth utilized in building the levees of the State, by the Levee Districts of the State, still continue to be moved mostly by scrapers drawn by mules. Wagons and graders are, in some instances, used in conjunction with scrapers. Work performed by power driven machinery has, during the past two years, advanced from third to second place in volume of work performed; that performed by men with wheelbarrows being, at this time, third in order as shown by the following:

During the past two years, the work performed by the Districts and the State, by the various methods employed, was (exclusive of the Orleans Levee District) as follows: By scrapers drawn by mules, 49.3 per cent.; by power-driven machinery 37.2 per cent., and by men with wheelbarrows 13.7 per cent.

The average cost of the levee work performed by the Levee Districts and the State, by all methods, during the past two years, was (exclusive of the Orleans Levee District) 22.5 cents per cubic yard; and by the three methods named, as follows: By scrapers drawn by mules 21.8 cents per cubic yard; by power-driven machinery 23.0 cents per cubic yard, and by men with wheelbarrows 23.7 cents per cubic yard.

SUPERVISION, CARE AND MAINTENANCE OF LEVEES.

The present status of operations, for the supervision, care and maintenance of levees in the State, by the Levee Districts and the State, is still not materially different from that described in the previous reports of this Board, and the reference to the subject heretofore made are so nearly equally applicable at this time, that the Board of State Engineers takes the liberty of herein again

simply reproducing its former remarks under this head, viz:

The work of construction proper having so far generally engaged and almost entirely absorbed the attention, efforts and resources of the Levee Districts of the State, the correlative proposition of supervision, care and maintenance has not everywhere yet received the material thought and consideration which it unquestionably demands.

It has, in the past, been primarily imperative, on the part of all interested, to build and to enlarge—the care and preservation of the work accomplished, being generally regarded as largely a matter of secondary consideration, and, in consequence, has, in many localities, been up to this time treated in a more or less tentative and desultory way.

The Board of State Engineers regards this to be an unwise policy to continue to pursue, and urges a more serious consideration of the subject in the future.

There exists in this State alone to-day, some 1496.6 miles of levees, and in that part of Arkansas aiding in the protection of Louisiana, 156.4 miles, or a total of 1653.0 miles, monuments to the foresight, broadmindedness, courage and energy of its people, but it cannot be recorded that the safeguards against their abuse and deterioration, provided by law, have everywhere yet been taken advantage of, nor put into practice.

The Levee Districts of the State and the Police Juries of the Parishes within Levee Districts, are specially charged by law with the duty of protecting, preserving and maintaining the public levees of the State, no matter under what authority constructed; but for the most part, in some of the Levee Districts, the authorities in this respect are not making much more than partial efforts, and in others none at all.

The Board of State Engineers, therefore, feels it incumbent upon itself to herein lay stress upon this fact, and to again put itself on record by reiterating its often expressed views on the subject, by urging with renewed emphasis that the time should, beyond question, no longer be delayed by these official bodies in seriously considering and formulating plans for more systematically, comprehensively, economically and effectively carrying out this fundamental principle of preserving and maintaining their lines of defense against overflow than heretofore.

More systematic organization for the constant supervision, care and maintenance of the levee lines than now prevails must, sooner or later, be adopted, not only by the Levee Districts, but by the United States as well, and the earlier the better. Work of a more or less serious character, and of greater or less extent, in one place and then another, along all the lines of levees in the State, is needed through the course of the year.

Without going into any specific detail about method and appliance, this should be undertaken and performed by permanent forces, suitably organized and properly equipped, on lines similar in most respects to the railroad section-gang system.

The various classes of work required, being peculiar to season, each class should and could be thus disposed of during the season when the best results will follow. These section gangs could be made the nucleus of high-water forces in the spring; then, upon the subsidence of the waters, of repair forces, to perform all work of a minor character incident to and following periods of high water, such as removing drift, restoring wave-wash, drainage, resodding embankment, where necessary, and collecting and storing all tools and materials. All weed-cutting could, at the proper time, also be done by such gangs, the patrolling of the levee lines at all times, as well as seeing that the laws for their preservation and maintenance are strictly enforced, and perform generally other auxiliary work, even to assisting engineering parties in field operations.

THE LEVEE DISTRICTS.

The regularly incorporated Levee Districts in the State number, at this date, seventeen, all of which, except two—the North Bossier Levee District and the Cat Island Levee District—are in active operation.

All these Districts possess corporate powers, exercised under the administration of Boards of Commissioners, varying in number from three to nine; and all, except the Orleans Levee District, are empowered to levy *ad valorem* taxes for levee purposes, not exceeding the constitutional limit of ten mills on the dollar. Up to the year 1913, the Orleans Levee District was restricted to an *ad valorem* tax of one mill on the dollar. However, by Act No. 251 of the General Assembly of the State, Session of 1912, the

power to levy and collect an additional ad valorem tax of two mills on the dollar, or three mills in all, was authorized and provided for, commencing on January 1st, 1913, and to maintain for a period of eight years. Most of the Districts also have power to levy assessments or forced contributions upon agricultural products raised within their territory, and upon railroads of standard gauge, while some of them, the boundaries of which touch upon the Gulf Coast and Bays, may impose a local assessment or forced contribution upon oysters.

The aggregate of District Levee Bonds now authorized is \$9,070,000.00, of which \$7,340,300.00 is, at this time, outstanding.

The total assessed valuation of the same Levee Districts, (exclusive of the Cat Island Levee District, in which no local assessments have so far been made), as shown on the tax rolls for 1913, is \$337,550,271.00.

A general description of the Levee Districts in the State, so far authorized by law, with statistical and other information of interest relating to them, follows:

1. *The Tensas Basin Levee District:* Composed of the Parishes of Morehouse, West Carroll, Richland, Franklin, Catahoula and LaSalle, with those portions of Ouachita and Caldwell Parishes lying East of the Ouachita River, aggregating some 2,825,000 acres in area. As the overflows to which the District is most liable result from flood waters escaping from the Arkansas and Mississippi Rivers, in Arkansas, authority in law is given to it to apply its resources to the construction, improvement and maintenance of such lines of levee in the State of Arkansas, South of the Arkansas River, as, in the judgment of the Board of Commissioners, concurred in by the Board of State Engineers, are recognized to possess a material bearing upon the protection of the District.

The United States "Upper Tensas District" includes the same levee line, and a large part of the levee work done on it continues to be contributed by the United States. The lengths of the lines of levee upon which this District directly depends for protection from overflow, and towards the construction and maintenance of which it directs its financial aid, are as follows:

On the Amos Bayou Ridge and Cypress Creek, 12.5 miles.

The Mississippi River, from the mouth of Cypress Creek to the State Line, 69.9 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of eight members, one being appointed from each Parish, or part of Parish, in the District.

The domicile of the Board is at Rayville, Richland Parish, Louisiana.

The District taxes and forced contributions permitted by law to be levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions, etc., thereon.

Forced Contributions: Five cents per acre on all lands within the District; \$60.00 per mile of standard gauge railroad, and \$30.00 per mile of railroad of less than standard gauge.

In addition to the foregoing resources of the District, 10 per cent. of the General Engineer Fund (17/20 of a mill general State Tax) is required by law to be set aside and expended annually in the interest of the District.

The authorized bonded debt of the District is \$150,000.00, of which \$65,000.00 is, at this time, outstanding.

The assessed valuation on the tax rolls for 1912 and 1913 was \$7,064,552.00, and \$7,880,032.00, respectively.

The amount and cost of the levee work done in the District, and in that part of Arkansas affecting the District, during the past two years, by the District, and the United States, is approximately as follows:

WORK DONE BY	Miles of		Cubic Yards	COST
	New Levee	Enlargement		
The District	0.57	13.47	1,174,735	\$262,544.72
United States	0.80	11.33	1,344,423	506,615.57
Totals.....	1.37	24.80	2,519,158	\$769,160.29

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done is approximately as follows:

46,885 cubic yards, to cost about \$12,424.52, located as follows:

At Amos Bayou Section 1 Extension and Section 4.

In addition to the foregoing, the District, during the same period expended, in minor repairs, high water expenses, and for the care, preservation and protection of its line generally, about \$38,271.09, classified as follows: Repair work and weed cutting \$2,006.75; high water expenses 1912, \$22,213.09, and high water expenses 1913, \$14,051.25.

The United States, in bank protection work, along reaches of the Arkansas and Mississippi Rivers, in Arkansas, affecting levees in which the Tensas Basin Levee District is interested, also entered upon projects involving considerable outlays of money.

The condition of the line of levee in Arkansas affecting Louisiana, from the point of view of grade, is, at this time, as shown in the following table:

COUNTY	0 to 1 Foot above High Water	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	Total Miles in County
	Miles	Miles	Miles	Miles	
Desha.....	2.09	5.02	11.69	8.95	27.75
Chicot.....	0.64	18.23	30.59	5.20	54.66
Totals.....	2.73	23.25	42.28	14.15	82.41
Percentages.....	3	28	51	18	

The lines of public levee built and maintained by the Tensas Basin Levee District are principally within the State of Arkansas; that is, that part of Arkansas, on the Mississippi River, North of the State Line, between Louisiana and Arkansas, to Luccas Landing, Arkansas, near the mouth of Cypress Creek, thence along Cypress Creek to Boggy Bayou, crossing the latter to Amos Bayou Ridge, and thence continuing along said Ridge to a point known as Costello's Gin, there ending abruptly in a wooded and sparsely

settled region, the general elevation of which is some seven feet below the high waters of recent years.

Between this point and the main line of the Iron Mountain Railroad System, some seven miles to the Westward, no protection has so far been provided, and, through this gap, a vast territory in Arkansas below is, therefore, annually subjected to overflow, as well as a considerable area of low land in the Tensas Basin, in Louisiana, impairing drainage generally, and at times, causing a congestion of waters, to bank full stages, in Bayou Macon, Bayou Boeuf and other streams.

The remedy for this, from the point of view of those situated below Amos Bayou is simple—the extension of the Cypress Creek and Amos Bayou System Westward to high ground. This the Tensas Basin Levee District, would at any time in the past have lent every aid and resource in its power to accomplish.

However, from the point of view of those situated North of this System, it appeared to be lending aid to the indefinite postponement of projects for which they had long been striving to protect themselves from overflow from the Mississippi River, escaping around the lower end of the Levee System on the latter and backing up through the gap between said point and Cypress Creek.

This situation is the only one in regard to which the co-operation of the levee interests of Louisiana and Arkansas has not been in all ways, and at all times, harmonious. In fact, it has, on occasion in the past, brought about such intense feeling as to jeopardize the maintenance of the System even within the limits reached, and a stage in the controversy appears to have now been reached when it may be as well to accept that the extension Westward cannot be consummated, and ultimate relief can only be looked for from the direction being insisted upon by the interests lying North of the Cypress and Amos Bayou System, namely, the extension of the main line of levee on the Mississippi River across to a junction with that below said Cypress and Amos Bayou System, whenever, in the opinion of the Mississippi River Commission, it be deemed logical and advisable to do so.

In fact, this, in the absence of the extension Westward, has been the attitude of Louisiana for some time past, namely, that, whenever, in the opinion of the Mississippi River Commission,

the lines of levee on the Arkansas River and the Mississippi River, above the mouth of Cypress Creek, compared favorably, in location, grade and section, with the line of levee below, from which protection was being received, then and in that case, it was hoped that the Government might see its way clear to provide for the accomplishment of the other proposition.

2. *The Fifth Louisiana Levee District*: Composed of the Parishes of East Carroll, Madison, Tensas and Concordia, aggregating some 1,525,000 acres in area.

That part of the levee in the District, extending from the Arkansas Line to a point opposite Warrenton, Mississippi, is included in the United States "Upper Tensas District," and that below said point, extending to the mouth of Red River, coincides with the United States "Lower Tensas District."

The total length of the levee line in the District at this date is about 240.9 miles, the present lower terminus of the System being within eight miles of the mouth of Red River.

The affairs of the District are conducted by a Board of Commissioners composed of eight members, two from each Parish.

The domicile of the District is at Tallulah, Madison Parish, Louisiana—Post Office address of the President of the Board of Commissioners, Tallulah, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions thereon.

Forced Contributions: Five cents per acre on all lands within the District; \$100.00 per mile on railroads of standard gauge; \$20.00 per mile on railroads of less than standard gauge, and \$1.00 per bale on all cotton grown within the district.

The authorized bonded debt of the District is \$1,000,000.00, of which there is outstanding, \$750,000.00.

The assessed valuation of the District on the tax rolls of 1913 was \$11,158,504.00.

The amount and cost of the levee work done in the District during the past two years, by the District, the State and the United States, is approximately as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	3.02	19.29	2,529,239	\$ 546,657.14
The State	0.92	14.89	1,077,838	302,217.57
The United States	13.63	32.55	4,880,756	1,173,073.13
Totals	17.57	66.73	8,487,833	\$2,021,947.84

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the District, is approximately as follows:

By the District	303,426 cubic yards	Costing \$101,142.00
By the State	72,510 cubic yards	Costing 20,181.80
Totals	375,936 cubic yards	Costing 121,323.80

This work is located as follows:

Reid-Biggs, Parish of Madison, Enlargement, by the District.
Diamond Island, Parish of Madison, Enlargement, by the State.

In addition to the foregoing, the District, during the same period, expended in minor repairs and for the care, protection and preservation of its line of levee generally, including high water expenses in 1912 and 1913, drainage of battures, etc., \$85,225.13, classified as follows:

Repair work, weed cutting, etc., \$3,322.60; high water expenses 1912, \$42,952.63; high water expenses 1913, \$37,197.72; drainage canals and ditches, \$1,752.18.

The United States assumed the construction of and accomplished much in the way of bank protection work in the District, also, during the past two years, involving further large expenditures.

The condition of the levee line in this District, with regard to grade, is, at this time, about as shown in the following statement, viz:

PARISH	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	4 to 5 Feet above High Water	5 to 6 Feet above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	Miles	
East Carroll.....	6.42	30.17	18.73	1.70		57.02
Madison	1.51	13.52	6.64	15.39	5.43	42.49
Tensas		11.45	46.40	0.89		58.74
Concordia.....	1.77	23.19	54.37	3.31		82.64
Totals.....	9.70	78.33	126.14	21.29	5.43	240.89
Percentages.....	4	33	52	9	2	

Within the length of the river extending from Greenville, Miss., to the mouth of Red River, a greater number of acute and deep concave bends are to be found on the Mississippi River than in any other lengths in its entire course. The menace from cut-offs, also, being more frequent, the construction of and maintenance of the lines of levee require more frequent renewals of line, often at very great distances from the river. The question of bank protection is, therefore, more vital than upon any other part of the river. Thus, the following bends on the Louisiana side have already been so treated by the Mississippi River Commission since its creation, viz: Louisiana Bend, Providence or Elton Bend, Delta Point, Reid-Biggs, Claggett, Kempe and Sycamore, while the following should *be*, viz: Haggaman, Mascot, Cabin Teele, Killarnie, Duckport, Cottage Home and Fish Pond, not to mention the material extension of the works at the localities already treated. It is advisable that the work of bank protection should not be delayed too late, other wise the foreshore may become so reduced as to preclude enlargement, and even to endangering the levee line itself by breaching before the completion of the revetment.

The problem of the proper grades has been a difficult one, due to crevasses in Arkansas, Louisiana and Mississippi; but the fact has been demonstrated that the Mississippi River Commission's provisional grade, so far given out, would not, in all localities, prove three (3) feet above the highest water.

Complete surveys of both the Upper and Lower Tensas Districts are now in progress by the United States, and when the data derived from these are available, no doubt other grades will be advanced more nearly adequate than those based upon the surveys of the past.

The Board of State Engineers, where the Mississippi River Commission's provisional grade proved less than three (3) feet above the highest water of record, has fixed the grades for its operations, under all circumstances than those, at three (3) feet above.

Every known place in the Fifth Louisiana Levee District, where weakness developed during the high waters of 1912 and 1913, has been repaired, and, with two exceptions, every new levee and every piece of enlargement undertaken during the past two years has been completed. It is, therefore, now only necessary to put forth every effort to continue to improve grades and sections, where needed, to establish continued confidence in the System. Vast improvement *has* been made, but much still remains to be done as new developments, from year to year, present themselves, and the maintenance of the System becomes more imperative.

3. *The Atchafalaya Basin Levee District:* Composed of the Parishes of Pointe Coupee, West Baton Rouge and Terrebonne, and parts of the Parishes of Iberville, Ascension, Assumption, Lafourche, St. Martin, St. Mary, Iberia and St. Landry, aggregating some 2,590,000 acres in area.

The District coincides with the United States "Atchafalaya District."

The District has a frontage on the right bank of the Mississippi River of 122.0 miles, extending from Torras to Donaldsonville; on Old River of 6.0 miles; and on the Atchafalaya River, along its left bank, from Barbres to its mouth, of about 160.0 miles, and of about 120.0 miles on its right bank, extending from Bayou Courtableau to the mouth of the river, of which only about 44.0

miles of the left bank of the river, from Barbres to a point about two miles below Bayou Alabama, are leveed. The lengths of the levee line in the District are as follows:

On the Atchafalaya River, 46.2 miles; on Old River, 5.5 miles; on the Mississippi River, 121.7 miles, and on Bayou Lafourche, about 75.0 miles. Since December 10th, 1903, however, Bayou Lafourche has been separated from the Mississippi River, by the construction of an earthen dam (preliminary to the construction of locks), and, therefore, the Bayou is no longer subject to the fluctuations which rendered a levee line necessary along its banks.

The affairs of the District are conducted by a Board of Commissioners consisting of seven members, three of whom are appointed from the Mississippi River Parishes, three from the Interior Parishes and at large on the recommendation of the railroads of the District.

The domicile of the District is at Port Allen, West Baton Rouge Parish, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the District, and possessions thereon.

Forced Contributions: Two and a half cents per acre on all land within the District; \$60.00 per mile of railroad line; 25 cents per 1,000 pounds of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 4 cents per ton of cane when same is removed from the limits of the District, and beyond the limits of any District in the State; 25 cents per bale of cotton; 2 cents per 100 pounds of seed cotton, when same is removed from the limits of the District, and beyond the limits of any other Levee District of the State; 1½ cents per sack of rough rice.

The authorized bonded debt of this District is \$1,000,000.00, of which \$850,000.00 is, at this time, outstanding.

The assessed valuation of the District, on the tax rolls of 1912 and 1913 was \$24,113,048.00 and \$24,878,078.00 respectively.

The amount and cost of levee work done in the District during the past two years by the District, the State and the United States, is, approximately as follows:

WORK DONE BY	Miles of		Cubic Yards of Earth Work	COST
	New Levee Built	Levee Raised and Enlarged		
ON THE MISSISSIPPI RIVER				
The District.....	3.85	15.40	2,223,651	\$ 505,866.71
The State	1.51	1.06	249,529	46,040.09
The United States.....	2.80	0.47	690,233	169,438.62
Totals.....	8.16	16.93	3,163,413	\$ 721,345.42
ON THE ATCHAFALAYA RIVER				
The District.....	4.24	9.47	1,294,659	\$ 410,131.54
The State.....	0.73		124,207	27,325.54
Totals.....	4.97	9.47	1,418,866	\$ 437,457.08
RECAPITULATION THROUGHOUT THE DISTRICT				
The District.....	8.09	24.87	3,518,310	\$ 915,998.25
The State.....	2.24	1.06	373,736	73,365.63
The United States.....	2.80	0.47	690,233	169,438.62
Totals.....	13.13	26.40	4,582,279	\$1,158,802.50

This work has been located as follows, viz:

Mississippi River: By the State; Smithland—(Red River Landing Section, Torras Enlargement Section, Torras (new) Crevasse Section, Ferguson Section.)

By the District: Torras Enlargement, Lower Torras, Bella Vista, Innis, Morganza, Grand, Morrison, Fannie Ritchie, Point Manior Spur, Belle Vale, Plaquemine City, Plaquemine City Front, Plaquemine City Front Extension, Rebecca, Levert, Germania, New Hope.

Atchafalaya River: By the State; Merrick, Hudson.

By the District: White Hall, Milan, Legonier, Haygood, Steve Barbres, Major Barbres, Middle Bayou to Starks Bayou, Garwood Bayou, Lake Bayou, Latanache South, Red Cross to Holloway,

Holloway, Holloway to Coville, Coville Crevasse, Coville to McCracken, McCracken Bayou, McCracken Bayou to Perreaux, and North of Alabama Bayou.

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done in the District, by the District, and by the State, is as follows:

By the District.....	1,925,907 cubic yards	Costing \$339,953.51
Totals.....	1,925,907 cubic yards	Costing \$339,953.51

This work is located as follows:

Mississippi River: By the District; Grand, Morrison, Belle Vale, Plaquemine City Extension, Ascension-New Hope.

By the District: Latanache South, Red Cross to Holloway, Holloway, Holloway to Coville, Coville to McCracken, McCracken to Perreaux, North of Alabama Bayou, and Port Barre South.

In addition to the foregoing, the District, during the same period, expended in minor repairs, high water expenses in 1912 and 1913, and for the care, preservation and protection of its line of levees generally, \$268,727.95, classified as follows:

Repair work, weed cutting, etc., \$70,204.42; revetment and other protection work, \$9,276.81; high water expenses 1912, \$76,101.20; high water expenses 1913, \$102,566.97; drainage, etc., \$10,578.55.

The condition of the line of levee in this District, on the Mississippi River, with regard to grade, is, at this time, about as shown in the following statement, viz:

PARISH	0 to 1 Foot above High Water	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
Pointe Coupee.....		20.30	14.86	14.28	49.44
West Baton Rouge.....	1.30	15.27	10.33	11.51	38.41
Iberville.....		1.65	9.89	16.36	27.90
Ascension.....				11.45	11.45
Totals.....	1.30	37.22	35.08	53.60	127.20
Percentages.....	1	29	28	42	

(Provisional grade recommended by the Mississippi River Commission: 4.3 at Red River Landing, and 4.2 at Donaldsonville, above high water.)

As will be seen from the foregoing statements, the District, upon the completion of the contracts for 1912 and 1913, will compare favorably with other Districts, although prior to undertaking the work comprehended in these contracts, it was, by reason of its location, perhaps more deficient in grade to withstand such a high water as that of 1912, than any other District in the State, the high water of 1912, reaching comparatively higher stages along its front—the Mississippi and Atchafalaya Rivers—than along that of any other of the Districts in Louisiana.

Notwithstanding that a most active and vigorous defense against high water was made throughout the District, by both the United States and the District forces, and over \$100,000.00 thus spent, the District suffered from two crevasses in 1912, one at McCracken Bayou on the Atchafalaya River, about one mile above the Frisco Railroad Bridge, and one at Torras on Old River.

The former did little general damage, situated as it was near the lower end of the Levee System, until the levee at Torras broke. Thus augmented, the combined effect of the two was to congest conditions in the Lower Atchafalaya Basin, and spread over a greater expanse of territory than otherwise, except possible in the event of a breach in the line of levee at Morganza.

The District again suffered from another crevasse, on the Lower Atchafalaya River, in 1913. Most remarkable conditions prevailed on the Lower Atchafalaya River at this time, which are, in a measure, attributable to the effects of the two crevasses in 1912, the McCracken Bayou, on the East Bank, and the Atkins Bayou on the West Bank, about four miles apart. These crevasses, discharging at the same time, at nearly opposite points, checked velocities in the main stream, thus preventing the usual scour or deepening of the channel at the terminus of the Levee Systems on the two banks of the river, and causing a shallowing of the channel immediately below the breaks. As a result, the river at the Frisco Bridge reached a height of 1.6 feet above 1912, while at Melville, twelve miles above, it was 0.2 lower, while at Simmsport, 37 miles above, it was 3.2 lower.

The rise on the Lower Atchafalaya was so unexpected and so rapid, that it overtopped about six miles of levee line from one to two feet before the line could be raised. For some hours prior to the break, the water was running over the top and down the back slope of about three continuous miles of levee, in an almost unbroken cataract, from a half to one foot deep, until a section was washed away at Coville about six miles below Melville, rapidly widening to a width of 4,000 feet. The closing of the three crevasses named required 579,946 cubic yards of earthwork, and cost the District \$133,618.28.

The repairs, supervision, care and maintenance of the levee line throughout the District has received close attention and consideration by the members of the Levee Board. The restoration of wave-wash, cutting of weeds, drainage of borrow pits, and cutting out leaky sections, etc., has been done with satisfactory results under the immediate supervision of the President of the Board, and the Chief Levee Inspector.

Conditions in the District at this time point to the necessity, in the near future, for the construction of new levees at Belle Vale, Poplar Grove and Eliza, West Baton Rouge Parish; Alhambra, Iberville Parish, and McCall, Ascension Parish. The estimated yardage required for these new levees will approximate 1,000,000 cubic yards.

4. *The Cat Island Levee District:* Situated in the Parish of West Feliciana. It comprises the territory on the East Bank of the Mississippi River from Ratcliff's Landing to Bayou Sara. It was created by Act 110 of 1894, which provided for the appointment of five Levee Commissioners, and authorized the issuance of bonds to the amount of \$100,000.00.

As stated in previous reports, surveys have shown that the cost of the levees necessary for the protection of this District would be excessive as compared with the probable revenues, and that, even after building an effective levee system, the drainage of the District during prolonged periods of high water could only be maintained by the operation of costly pumping machinery. Under these circumstances, no action has ever been taken by the Commissioners for raising funds or for undertaking levee work.

5. *The Pontchartrain Levee District:* Composed of the alluvial lands on the East Bank of the Mississippi River, between the

Cities of Baton Rouge and New Orleans, consisting of parts of the Parishes of East Baton Rouge, Iberville, Ascension, St. James, St. John, St. Charles and Jefferson, aggregating some 365,000 acres in area. Its situation is so favorable as to make it dependent for protection solely upon the integrity of its 125.8 miles of levee line on the Mississippi River Front of the District, and upon its "Upper Protection" levee, extending from the main line of levee on the Mississippi River, back to the highlands.

The District is included in the United States "Pontchartrain District."

The affairs of the District are conducted by a Board of Commissioners consisting of nine members, one from each Parish in the District, and one representative, respectively, of the Illinois Central Railway Company, and of the Louisville, New Orleans & Texas Railway Company.

The domicile of the District is at Convent, St. James Parish, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow, and possessions thereon.

Forced Contributions: Three cents per acre on all land other than that cultivated in sugar, cotton or rice (except swamp land subject to tidal overflow); 15 cents per barrel of sugar; 50 cents per hogshead of sugar; 5 cents per barrel of molasses; 3 cents per sack of rough rice; 50 cents per bale of cotton; 7½ cents per ton of sugar cane, grown in the District and removed therefrom before being converted into sugar; 4 cents per 100 pounds of seed cotton, grown in the District and removed therefrom; \$100.00 per mile of main line of railroad.

The authorized bonded debt of the District is \$1,000,000.00, of which \$505,300.00 is, at this time, outstanding.

The assessed valuation of the District on the tax rolls of 1912 and 1913 was \$11,249,712.00 and \$11,157,003.00 respectively.

The amount and cost of levee work done in the District, during the past two years, by the District, the State and the United States, was approximately as follows, viz:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District.....	2.81	11.93	1,849,478	\$435,134.34
The State.....	1.06		186,410	44,205.81
The United States	3.43		677,777	139,182.12
Totals.....	7.30	11.93	2,713,665	\$618,522.27

The location of the work is as follows:

By the State: St. Joseph's Church, Cornland, Anchor, Upper Protection Levee to Southport reinforced concrete revetment.

By the District: South Boulevard to Protection Levee, Protection Levee to Arlington, East Baton Rouge Parish; Hermitage, Iberville Parish; Mount Olive, Point Clair, Gem, Hermitage, Ascension Parish; Bourbon, Remy, Hope, Hope Extension, St. James Parish; Cornland (Upper), Cornland (Lower), Bonnet Carre, St. John Parish; Sarpy Revetment, St. Charles Parish; Deckbar North, Upper Protection Levee to Southport, Jefferson Parish.

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the District, is as follows: By the District: Mount Olive \$17,220.00; Point Clair \$8,741.20; Deckbar North \$2,925.34—Total \$28,886.54.

In addition to the foregoing, the District, during the same period, expended in minor repairs, high water expenses, and for the care, protection and preservation of its lines of levee generally, \$238,433.37, classified as follows:

Repair work, weed cutting, etc., \$52,747.90; revetment and other protection work, \$11,472.59; high water expenses 1912, \$71,090.27; high water expenses 1913 to April 1, 1914, \$93,586.93; drainage canals and ditches, \$9,535.68.

The condition of the line of levee in this District, with regard to grade, is, at this time, about as shown in the following statement. viz:

PARISH	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	
East Baton Rouge.....	4.00	9.59	0.50	14.09
Iberville	9.82	9.79	7.03	26.64
Ascension.....	0.17	11.14	7.76	19.07
St. James		6.62	16.54	23.16
St. John		8.43	6.07	14.50
St. Charles		10.37	6.47	16.84
Jefferson		6.04	5.49	11.53
Totals.....	13.99	61.98	49.86	125.83
Percentages	11	49	40	

(Provisional grade recommended by the Mississippi River Commission; 4.6 at Baton Rouge, and 4.0 at upper line of Orleans Parish, above high water,)

The unprecedented high water of 1912, which was 3.2 higher at Baton Rouge, the upper end of the District, and 1.9 higher at New Orleans, the lower end of the District, than any previous water of record, rendered it necessary, in the event of a repetition of this flood, to raise many miles of the levee line of the District.

This the Board of Commissioners immediately undertook to do, but the high water of 1913 so closely followed that of the previous year, that no opportunity was had to perform any but a small percentage of the work required until the following season of 1913 and 1914. As soon as the 1913 water had receded, surveys were made of all stretches of levee which were less than three (3) feet above the 1912 water, and the work involved, advertised and let. The contracts for this work have all been completed, except Mount Olive and Pointe Clair in Iberville Parish, and Deckbar North in Jefferson Parish.

Of these about 5 miles are completed and about 4 miles still to be done. When these three remaining contracts are completed, there will still be in the District about 76.0 miles less than three (3) feet above the 1912 water. To accomplish this work, and build the new levees made necessary by caving banks, the District was forced to anticipate all of its revenues for 1915, issuing scrip in payment therefor payable out of the revenues of that year.

A very serious condition developed in the latter part of the month of August at the Bourbon and Remy Levees, in the Parish of St. James. The caving which had been steadily active for some years past in this bend, became more aggravated, the river bank after rapidly approaching to within 400 feet of the centre of the levee, in a single night the entire foreshore suddenly caved off up to and into the edge of the base of the levee on the river side. This rendered it necessary to build a new line about 4,500 feet in length, and containing about 215,000 cubic yards. The contract for this was let September 4th, 1913, and work begun at once.

In the latter part of November other caving, of a like nature, occurred a short distance below the lower end of this work, making it necessary to extend it about 2,000 feet. This levee containing 120,000 cubic yards was let December 22d. Both contracts have been completed and the situation in this bend is now apparently safe.

The most notable work done in the District in recent years was that done at Bonnet Carre. This levee during its entire existence had always caused more or less concern during every high water. In 1912, during the highest stage of the water, leaks, sand boils and sloughs developed to such an alarming extent, that a force of 250 convicts were called into service to arrest the sloughing, and a crevasse at this point was but narrowly averted.

When the water receded it was decided to completely demolish this line of levee, explore the foundation by excavating to a depth three feet below the natural surface of the ground, and rebuild the levee to standard grade and section, crown ten (10) feet wide, river side slope three (3) to one (1), land side slope four (4) to one (1), with a grade of three (3) feet above 1912 water. The excavation revealed that the base of that part of the levee built through the channel of the Bonnet Carre Crevasse of 1874 was

underlaid with logs and drift to a surprising extent. Since the new levee has been built, no repetition of the experiences of the past has so far occurred.

All repairs, including restoration of wave-wash, cutting of weeds and drainage of borrow pits, have been completed, and the District in all respects compares favorably with other Districts. Indications, however, at this time, point to the necessity in the early future for the construction of new levees at Granada, Manchac, Hermitage, Hundred Mile Plantation, in Iberville Parish; Southwood and Mount Houmas in Ascension Parish; Reserve in St. John Parish; Sarpy and Victoria in St. Charles Parish, and Soniat in Jefferson Parish.

6. *The Lafourche Basin Levee District:* Composed of all the alluvial lands, except the Parish of Orleans, lying between Bayou Lafourche, the Mississippi River and the Gulf of Mexico, and those parts of the Parishes of Ascension, St. James, St. John, St. Charles, Jefferson and Plaquemines, lying on the right or West Bank of the Mississippi River, from Donaldsonville to the lower line of Riceland Plantation, and of the Parishes of Ascension, Assumption and Lafourche, lying on the left bank of Bayou Lafourche, from Donaldsonville to "Chere Ami Canal," aggregating some 795,000 acres in area.

The lengths of the levee lines in this District are: On the Mississippi River, 119.5 miles, and on Bayou Lafourche, 74.1 miles.

As in the case of the Atchafalaya Basin Levee District, the Lafourche Levee District is no longer directly subject to overflow from Bayou Lafourche, rendering a levee line along its banks unnecessary, so long as the dam at the head of the Bayou, at Donaldsonville, is maintained, or locks be substituted therefor.

This District includes all of the United States "Lafourche District," and the upper part of the United States "Barataria District."

The affairs of the District are conducted by a Board of Commissioners composed of nine members, one from each Parish or part of Parish in the District, and one in the District at large, appointed on the recommendation of the railroads of said District.

The domicile of the District is at Donaldsonville, Ascension Parish, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions thereon.

Forced Contributions: 2½ cents per acre on all land; \$100.00 per mile of all standard gauge line of railroad operated by steam, excepting railroads the total length of which in the State is less than 100 miles, upon which the rate shall be \$50.00 per mile; 10 cents per barrel of sugar; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges.

The authorized bonded debt of the District, all of which is outstanding, is \$500,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$14,177,620.00 and \$15,596,017.00 respectively.

The amount and cost of the levee work done in the District, during the past two years, by the District, the State and the United States, is as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	1.13	6.73	479,772	\$ 99,883.26
The State	2.45	0.30	296,881	62,382.60
The United States	5.44	7.23	968,302	203,879.43
Totals	9.02	14.26	1,744,955	\$366,145.29

The amount and cost of the levee work still remaining at this time, under existing contracts to be done in the District, is as follows:

By the District 40,814 cubic yards Amounting to \$9,987.39

In addition to the above, the District, during the same period, expended in repairs, revetment and high water disbursements, for the care, preservation and protection of its line of levee generally, \$311,472.90, classified as follows:

Report of Board of State Engineers,

PARISH	Repairs, Weed Cutting, Restor- ing Wave Wash Etc.	Revetments	High Water Expenses	Total by Parishes
From April 20th, 1912 to December 31st, 1912				
Ascension.....	\$ 74.75		\$ 2,389.43	\$ 2,464.18
St. James.....	1,269.25		8,829.24	10,098.49
St. John.....	3,518.30		13,268.91	16,787.21
St. Charles.....	2,273.69		20,303.84	22,577.53
Jefferson.....	4,723.90		12,098.85	16,822.75
Plaquemines.....	7,050.18	\$17,431.62	21,831.44	46,313.24
Totals.....	\$18,910.07	\$17,431.62	\$78,721.71	\$115,063.40
From January 1st, 1913 to December 31st, 1913				
Ascension.....	\$ 2,338.14		\$ 4,151.43	\$ 6,489.57
St. James.....	2,468.87		7,087.53	9,556.40
St. John.....	4,599.11	\$ 598.15	10,073.40	15,270.66
St. Charles.....	7,803.56		33,430.38†	41,233.84
Jefferson.....	3,789.14	13,570.78	41,904.29†	59,264.21
Plaquemines.....	12,881.83	9,995.32	19,360.16	42,237.31
Totals.....	\$33,880.65	\$24,164.25	\$116,007.09	\$174,051.99
From January 1st, 1914 to March 31st, 1914				
Ascension.....				
St. James.....	\$1,168.35	\$ 5.40		\$ 1,173.75
St. John.....	196.00	2,062.16		2,258.16
St. Charles.....	441.35			441.35
Jefferson.....	1,155.00	2,370.86		3,525.86
Plaquemines.....	3,368.00	11,590.39†		14,958.39
Totals.....	\$6,328.70	\$16,028.81		\$22,357.51

† Includes expenditures for emergency work over and above contract price to complete new levees that were under contract in advance of an early rise in the river.

‡ Does not include Certificate of Indebtedness issued to Algiers Saw and Planing Mill for \$12,091.28 for revetment lumber used but not yet paid for.

The condition of the line of levee in this District, with regard to grade is, at this time, about as shown in the following statement:

PARISH	0 to 1 Foot above High Water	1 to 2 Feet above High Water	2 to 3 Feet above High Water	3 to 4 Feet above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
Ascension.....		1.74	3.66	1.99	7.39
St. James.....		5.08	11.97	4.41	21.46
St. John.....	3.82	4.68	4.60	1.55	14.65
St. Charles.....	2.80	4.38	6.70	4.34	18.22
Jefferson.....	3.06	5.39	5.61	6.22	20.28
Plaquemines.....	1.23	6.44	15.02	14.79	37.48
Totals.....	10.91	27.71	47.56	33.30	119.48
Percentages.....	9	22	40	29	

The provisional grade recommended by the Mississippi River Commission for the District is as follows: 36.9 on the Donaldsonville Gauge, 31.8 on the College Point Gauge, 23.0 on the Carrollton Gauge, and 33.8 on the Riceland Gauge. Since the occurrence of the 1912 flood, all State and District work has been constructed to a grade 3.0 feet above the 1912 high water plane. This grade overtops the present Mississippi River Commission Grade by the following amounts at the places designated below:

Donaldsonville.....	1.2 feet	College Point.....	1.4 feet
New Orleans.....	0.7 “	Riceland.....	0.6 “

It is estimated that at this date, approximately 4,500,000 cubic yards of earthwork is needed to bring the District up to a grade three (3) feet above the 1912 high water and to full section. On account of the occurrence of the two high waters of 1912 and 1913, the maintenance expenses of the District have been unusually heavy, and consequently the funds available for permanent construction work were much reduced.

The present Levee Board found itself in a very trying position during the early part of 1913, on account of having to take over several pieces of unfinished new levee on which the Contractors had defaulted, and it was obliged to resort to heroic efforts in order to complete these unfinished contracts in the face of the rising river. As a measure of self-protection against such contingencies in the future, it was decided to purchase a levee building machine which could take care of similar emergencies. This machine was received from the manufacturers, on November 27, 1913, and since then has been engaged in levee construction in Jefferson Parish. The results obtained have been highly satisfactory and the venture as at present directed and operated, is proving an unqualified success. During the period from November 27, 1913 to March 31, 1914, the machine constructed 3.4 miles of enlargement, comprising 154,995 cubic yards of earthwork, at a construction cost of $9\frac{1}{8}$ cents per cubic yard. To the actual cost of construction should be added an arbitrary constant of 2 cents per cubic yard to cover interest on the investment and deterioration. The estimated unit price for this piece of work, if it were let by contract, is 24 cents, so that even with the addition of about \$3,100.00 of fixed charges, to the actual cost of construction, there was effected a saving of approximately \$20,000.00 during a period of four months work.

The machine was moved to the Glendale Batture Levee just above Hymelia Crevasse on April 1st, and is at present working at that place.

7. *The Orleans Levee District:* In response to the request of the Board of State Engineers for information in regard to the operations of the Orleans Levee District, during the past two years, a report, under date of April 1st, 1914, was received from the Honorable Leigh Carroll, President, Board of Commissioners of the Orleans Levee District, so exhaustively covering the subject, that the Board of State Engineers is more than pleased to reproduce in full, as presented, viz:

“State of Louisiana.

“Office of the Board of Levee Commissioners
of The Orleans Levee District,

“Suite No. 201, New Orleans Court Building.

"New Orleans, La., April 1st, 1914.

"Major F. M. Kerr, Chief State Engineer, City.

"Sir:—The Board of Levee Commissioners of the Orleans Levee District has the honor to submit for your information the following report with accompanying appendices, covering the period from April 1st, 1912 to April 1st, 1914:

DUTIES AND PERSONNEL OF THE BOARD.

"The Board of Levee Commissioners of the Orleans Levee District was created by Act 93 of the General Assembly of the State of Louisiana, approved July 7th, 1890. Under the provisions of this Act, the Parish of Orleans was 'formed into a public levee district,' and a Board of Levee Commissioners composed of nine persons possessing all the requisites of a qualified elector in said Parish, administer the affairs of the District, seven of whom were appointed by the Governor of the State from the several municipal districts of the City, and two (the Mayor and Commissioner of Public Works of the City of New Orleans) being ex-officio members of the Board.

"The said Board of Levee Commissioners is charged with the construction and repairs and invested with the control and maintenance of all levees in the said Orleans District, whether on river, lake, canal or elsewhere. The said Board of Levee Commissioners, as to location, construction and repairs of all levees on the river front of said District, shall first have the approval in writing of the State Board of Engineers.

LENGTH OF LEVEE LINE.

"The public levee lines of the District lie on both sides of the Mississippi River, that on the left or East Bank being 12.05 miles, and that on the right or West Bank 13.70 miles in length. The District also maintains lines of 'Rear Protection Levee' aggregating about 51.6 miles in length.

"The domicile of the Board is the City of New Orleans; at present it occupies Suite No. 201, New Orleans Court Building, at the corner of Royal and Saint Louis Streets.

GRADES OF LEVEES.

"Of the 12.05 miles of levee on the left, or East Bank, 6.70 miles, or 55.6 per cent. of the line is 3 to 4 feet above the highest water of record, 1912; 3.85 miles, or 31.9 per cent. is 2 to 3 feet; 0.2 miles, or 1.7 per cent. is 1 to 2 feet; and 1.3 miles, or 10.8 per cent. is 0 to 1 foot.

"Of the 13.70 miles on the right, or West Bank, 6.66 miles, or 48.6 per cent. of the line is 3 to 4 feet above the highest water of record, 1912; 0.96 miles, or 7 per cent. is 2 to 3 feet; 5.22 miles, or 38 per cent., 1 to 2 feet; 0.86 miles, or 6.4 per cent. is 0 to 1 foot.

"In consequence of the low grades and other defects of a more or less serious character, here and there, the Orleans Levee District, in response to public demand, some seven years ago inaugurated a movement to improve and maintain as rapidly as possible its levee lines along the Mississippi River to the grades and sections as recommended at that time by the Board of State Engineers.

FORMULA OF THE BOARD OF STATE ENGINEERS.

"In general terms, this formula proposed an embankment of earth to be built and maintained to a grade not less than five (5) feet above the high water of 1903, with a crown not less than fifty (50) feet wide, river side slope not steeper than three horizontal to one vertical, and land slope not steeper than ten horizontal to one vertical; the flattening of slopes and widening of crown beyond these limits to be governed by the special requirements of what is known as the 'Commercial Front,' on the left or East Bank of the river. On the right or West Bank of the river the levees to be raised and enlarged to a grade five (5) feet above the high water of 1903, with crown ten feet wide; river side slope not steeper than three horizontal to one vertical; land side slope not steeper than four horizontal to one vertical.

PROVISION OF FUNDS.

"To carry out this project, necessarily involved a large outlay of money for the payment of property appropriated, as well as the cost of construction and maintenance of levee lines. Up to

date some \$5,637,514.22 has been expended, which amount is divided as follows:

“First—By contract work undertaken in construction, and enlargement of certain stretches of the levee line on the Mississippi River, and in the rear, amounting to 2,580,616.12 cubic yards of earth, and wooden revetments, demolition of buildings, etc., at a cost of \$1,277,074.58.

“Second—Maintenance, repair and operating expenses, approximately \$500,240.42. Interest on bonds, loans and certificates on property appropriated approximating \$1,044,391.73 and some \$2,815,807.49 has been paid out for the purchase of property, which includes some \$443,990.94 of outstanding certificates issued for the appropriation of property bearing five (5) per cent. interest; so far averaging, as shown by the work undertaken since the inception of the project, nearly three times as much as the cost of the levee work itself.

SOURCES OF REVENUE.

“The District appealed to the General Assembly of the State of Louisiana in 1908, and succeeded in having its previous bonded indebtedness of \$500,000.00 increased to \$3,000,000.00, this amount is outstanding. It again appealed to the General Assembly of the State of Louisiana in 1912, and succeeded in increasing its annual ad valorem tax of one mill to three mills on the dollar, for a period of eight years, commencing on January 1st, 1913, on all property subject to taxation, situated in the District, and in addition it receives an annual allotment by the State of \$10,000.00 from the General Engineer Fund, which is 17/20 of a mill tax on the Assessed valuation of the State. The assessed valuation of the District on the Tax Rolls of 1912 and 1913 was \$242,049,606.00 and \$245,458,994.00, respectively.

SUMMARY OF WORK DONE IN THE PAST TWO YEARS.

“From the tabulated statement in exhibits it will be seen that expenditures for levee purposes during the past two years have been as follows:

Earthwork: New Levee and enlargement, containing 911,897.62 cubic yards, and costing \$247,548.21.

Revetment: 11,573.3 linear feet of revetment, and 1,628 linear feet of pile bulkhead, at a cost of \$26,481.26.

Maintenance and Repair: General maintenance and repair of levees, labor and material, and other expenses incidental to operation of Board, including salaries of employes \$151,561.26.

"Total expenditure, as above \$425,590.73.

FUTURE WORK.

"The general improvement of the levee lines on the East and West banks of the Mississippi River since the high water of 1908 has been progressing steadily, yet there remains considerable work to be done to bring the same up to grade and section as recommended by the Board of State Engineers, as shown in detailed attached statements, approximately estimated at 2,250,000 cubic yards divided as follows:

Orleans Parish, Left Bank.....	1,500,000
Orleans Parish, Right Bank.....	750,000

"In addition the line of Rear Protection Levees along the Lake shore should be raised and enlarged to a grade of 30.0 Cairo Datum, with crown ten feet, and slopes 3 and 4 to 1, which will require approximately 250,000 cubic yards.

"The levees on the banks of Bayou St. John, Carondelet and New Basin Canals which are navigable waterways, should be raised and enlarged, or substituted by suitable Locks, placed in line with the existing Lake shore Rear Levees. The levees on existing outfall Drainage Canals, should be raised or enlarged or be substituted by Pumping Stations placed at the intersection of the existing Lake shore Rear Levees. It will take upwards of 1,050,000 cubic yards of earth to raise and enlarge these levees to a grade of 30.0 Cairo Datum with crown 10 feet and slopes 3 and 4 to 1.

"Vide Exhibits C-1, C-2, C-3, following.

"The statement with regard to levees on the East and West bank of the Mississippi River is conjectured, and is based on the banks of the river remaining permanent.

BANK PROTECTION.

"The urgency of the character of work required to protect the banks from caving, and to fix the Harbor Lines in the Port of New Orleans has long been admitted by the United States Government, and considerable work has been accomplished through appeals to the Government by her Commercial Bodies, et als.

"Since the inauguration of this project by the Orleans Levee District, the United States Government has expended in revetments of the banks with sub-aqueous mattress work, some \$822,000.00, distributed as follows:

LINEAR FEET OF BANK PROTECTED IN NEW ORLEANS HARBOR
FROM 1907 TO DATE AND AMOUNTS EXPENDED.

Season 1907-1908--	Expended
1,570 lin. ft. protected at Amesville;	
900 lin. ft. protected at Third District Reach.....	\$100,000.00
Season 1908-1909--	
5,937 lin. ft. protected at Third District Reach.....	150,000.00
Season 1909-1910--	
3,955 lin. ft. protected at Carrollton Bend.....	100,000.00
Season 1910-1911--	
2,765 lin. ft. protected at Gretna Front;	
3,975 lin. ft. protected at Carrollton Bend;	
1,110 lin. ft. protected at Third District Reach.....	175,000.00
Season 1911-1912--	
3,090 lin. ft. protected at Third District Reach;	
600 lin. ft. protected at Carrollton Bend;	
2,215 lin. ft. protected at Gretna to Algiers Point;	
2,480 lin. ft. protected at Greenville Bend.....	182,000.00
Season 1912-1913--	
1,500 lin. ft. protected at Westwego;	
2,770 lin. ft protected at Amesville Bend	115,000.00
Total.....	<u>\$822,000.00</u>

"The Board of Levee Commissioners of the Orleans Levee District have repeatedly announced that if the National Government will undertake the task of bank protection, the District will construct and maintain all the levee lines required. To do this work effectually would require an annual expenditure of \$300,000.00 by the United States Government, as recommended by its Corps of Engineers, until the project of bank protection and fixing the harbor lines is completed.

"Very respectfully,

(Signed) Leigh Carroll, President,
Board of Levee Commissioners of the
Orleans Levee District."

"B"

Statement comparing elevation of levee lines in the Orleans Levee District with the highest water of record (1912).

	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Length	Cubic yards re- quired to con- form to the grade and section pre- scribed by the Board of State Engineers.
Orleans Parish, Left Bank.....	Miles 1.30	Miles 0.20	Miles 3.85	Miles 6.70	Miles 12.05	1,500,000
Orleans Parish, Right Bank.....	0.86	5.22	0.96	6.66	13.70	750,000
Total.....	2.16	5.42	4.81	13.36	25.75	2,250,000
Percentages:						
Left Bank.....	10.8%	1.7%	31.9%	55.6%		
Right Bank.....	6.4%	38%	7%	48.6%		

GRADES.

GRADE AND SECTION RECOMMENDED BY THE BOARD OF
STATE ENGINEERS.

Grade: Five (5) feet net, above the high water of 1903.

Section: Left Bank crown not less than 50 feet wide; river side slope not steeper than 3 to 1; land side slope not steeper than 10 to 1.

Right Bank, crown not less than 10 feet wide, river side slope not steeper than 3 to 1; land side slope not steeper than 4 to 1.

Rear Protection and Canal Levees: Crown not less than 10 feet wide, water side slope not steeper than 3 to 1, land side slope not steeper than 4 to 1.

EXHIBIT C-1.

State of Louisiana,
Office, Board of Levee Commissioners of
the Orleans Levee District.

New Orleans, La., April 1st, 1914.

Statement showing approximate elevation of levees, above highest water (1912) in Orleans Levee District, left or East Bank of the Mississippi River; also, approximate quantities of earth-work required to place said line to the Board of State Engineer's grade, which is five (5) feet above the high water (1903), with crown 50 feet wide and slopes 3 to 1 river side and 10 to 1 land side.

LOCALITY	Linear Feet	Feet Above High Water 1912	Crown 50 Feet Cubic Yards	REMARKS
Upper Protection Levee to Upper Line of Audubon Park	10,382	3 to 4	200,000	} Completed 10 Ft. Crown
Upper Line of Audubon Park to Joseph St.	6,652	3 to 4	120,000	
Joseph St. to Napoleon Ave.	5,900	3 to 4	339,000	} Completed 10 Ft. Crown
Napoleon Ave. to Louisiana Ave.	4,570	0 to 1	70,000	
Louisiana Ave. to St. Mary St.	6,529	2 to 3	105,000	} Completed 50 Ft. Crown
St. Mary St. to Canal St.	9,000	2 to 3	120,000	
Canal St. to Barracks St.	2,294	0 to 1	66,000	
Canal St. to Barracks St.	1,056	1 to 2	33,000	
Canal St. to Barracks St.	1,430	2 to 3	33,000	
Barracks St. to Montegut St.	3,040	2 to 3	33,000	
Montegut St. to Louisa St.	1,240	3 to 4	20,000	
Louisa St. to Kentucky St.	3,816	3 to 4		
Kentucky St. to Eganias St.	3,580	3 to 4	140,000	
Eganias St. to Parish Line	4,135	3 to 4	221,000	
Totals	63,624		1,500,000	

EXHIBIT C-2.

State of Louisiana,
Office, Board of Levee Commissioners of
the Orleans Levee District.

New Orleans, La., April 1st, 1914.

Statement showing approximate elevation of levees, above highest water (1912) in the Orleans Levee District, right or West Bank; also approximate quantity of earth required to place said line to the Board of State Engineer's grade, which is five (5) feet above the high water (1903) with crown 10 feet and slopes 3 and 4 to 1.

NAME OF LEVEE Station to Station.	Linear Feet	Feet above High Water 1912	Cubic Yards
Parish Line to Canal Street Ferry—			
00+00 to 51+16.....	5,116	1 to 2	80,000
Canal Street Ferry to S. P. R. R. Yards—			
51+16 to 75+35.....	2,419	1 to 2	25,000
75+35 to 111+80 (S. P. R. R. Yards)	3,645	0	
S. P. R. R. Yards to U. S. Naval Station			
111+80 to 119+40.....	760	2	10,000
119+40 to 156+90 (U. S. Naval Sta.)	3,750	3	
U. S. Naval Station to Convent—			
156+90 to 175+00.....	1,810	2	80,000
Convent to Camus—			
175 to 192.....	1,700	2	25,000
Camus to Aurora—			
192 to 242.....	5,216	2	150,000
Aurora—			
242 to 309+83.....	6,783	4	70,000
Cut Off Road to Orleans Quarters—			
309+83 to 353+56.....	4,373	4	
Orleans Quarters to Stanton —			
353+56 to 413+64.....	6,165	4 and 2	250,000
Stanton to Upper Beka—			
413+64 to 642+78.....	22,914	4	
Upper Beka to Lower Beka —			
642+78 to 682+78.....	4,000	2	60,000
Lower Beka to Parish Line—			
682+78 to 719+63.....	3,685	4	
Totals.....	72,336		750,000

EXHIBIT C-3.

State of Louisiana,
Office, Board of Levee Commissioners of
the Orleans Levee District.

New Orleans, La., April 1st, 1914.

Statement showing approximate quantities of earthwork required to raise and enlarge Rear Protection and Canal Levees to grade 30.0 Cairo Datum, crown 10 feet wide, and slopes 3 to 1 on water side, and 4 to 1 on land side.

NAME OF LEVEES	Cubic Yards	
East Bank 17th Street Canal.....	150,000	
New Basin Canal East and West Banks.....	350,000	
Bayou St. John " " " ".....	300,000	
Orleans Canal " " " ".....	105,000	
London Avenue Canal East and West Banks..	140,000	
Peoples Avenue Canal " " " ".....	5,000	1,050,000
Lake Shore:		
17th Street Canal to Peoples Avenue Canal..		250,000
Total.....		1,300,000

8. *The Lake Borgne Basin Levee District:* Composed of the alluvial lands on the East Bank of the Mississippi River below the City of New Orleans, situated in the Parish of St. Bernard, and in that part of Plaquemines Parish lying North of the lower line of Bohemia Plantation, aggregating some 110,000 acres in area.

The District is included in the United States "Lake Borgne District."

The length of the levee line of this District, all fronting on the Mississippi River, is 49.34 miles.

The affairs of the District are conducted by a Board of Commissioners consisting of three members, one from each Parish in the District, and one representative of the New Orleans and Southern Railroad Company.

The domicile of the District is at New Orleans, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District and possessions thereon.

Forced Contributions: Five cents on each and every acre of land within the limits of the District susceptible to cultivation; \$60.00 per mile of railroad line; 25 cents per bale of cotton; 35 cents per hogshead of sugar; 10 cents per barrel of sugar; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 2½ cents per sack of rough rice; ½ cent per bushel of esculents; 2½ cents per barrel of oranges produced in said District; 1½ cents per barrel of oysters gathered from the waters within the limits of the District.

The authorized bonded debt of the District, all of which is outstanding, is \$100,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$5,722,540.00 and \$6,414,213.00, respectively.

The amount and cost of the levee work done in the District, during the past two years, by the District, the State and the United States, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	0.65	0.76	97,501	\$ 27,617.63
The State	0.60	4.05	161,066	39,863.94
The United States	1.18	6.03	294,477	60,287.46
Totals	2.43	10.84	553,044	\$127,769.03

In addition to the foregoing, the District, during the same period, expended in minor repairs, high water expenses, and for

the care, preservation and protection of its line of levees generally, \$101,267.56, classified as follows:

Repair work, weed cutting, etc., \$50,582.23; revetment or other protection work, \$3,428.72; high water expenses 1912, \$14,945.82; high water expenses 1913, \$32,310.79.

The condition of the line of levee in this District, with regard to grade, is, at this time, about as shown in the following statement:

PARISH	0 to 1 Feet Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Miles in Parish
	Miles	Miles	Miles	Miles	
St. Bernard.....	0.80	1.69	1.88	6.24	10.61
Plaquemines.....	5.83	8.95	9.51	14.44	38.73
Totals.....	6.63	10.64	11.39	20.68	49.34
Percentages.....	13	22	23	42	

The greater part of the funds expended, during the past two years, by the State and the District, has been for work between the Barracks and Chalmette. The improvement of the levee line in the Parish of Orleans suggested the desirability of continuing the improvement of the levees adjacent to the City. Accordingly these have been increased in height and section, and the earthen embankments have been supplemented with other works of a substantial character. The previous wooden revetments have been replaced by a creosoted timber bulkhead for the upper 920 feet of the District, and below the bulkhead, a reinforced concrete revetment has been constructed for 2,922 linear feet, which, in addition to preventing wave-wash, will reduce sipage to practically nothing.

9. *The Grand Prairie Levee District:* Composed of the alluvial lands subject to overflow on the left bank of the Mississippi River, embraced within the Parish of Plaquemines, from the lower line of Bohemia Plantation to the lower line of Baptiste Collette Gap, aggregating some 25,000 acres in area.

The District is included in the United States "Lake Borgne District."

The length of the levee line in this District is 31.22 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of five members.

The domicile of the District is at Pointe-a-la-Hache, Plaquemines Parish, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions thereon.

Forced Contributions: One Dollar on every arpent front of land within the District facing the Mississippi River; \$30.00 per mile of standard gauge of railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per ton of sugar cane; 7½ cents per barrel of syrup; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of esculents; 5 cents per barrel of oranges produced within the limits of the District, and 3 cents per barrel of oysters gathered from the waters of the District.

The authorized bonded debt of the District, all of which is outstanding, is \$30,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$202,420.00 and \$203,670.00, respectively.

The amount and cost of the levee work done in the District, during the past two years, by the State and the United States, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The State.....	0.26	1.74	28,414	\$ 5,054.77
The United States	0.99	4.64	145,014	20,167.53
Totals.....	1.25	6.38	173,428	\$25,222.30

The District expended, in addition to the foregoing, in minor repairs, high water expenses, and for the care, preservation and protection of its line of levee, something additional, but the amounts were not furnished up to the date of this report.

The condition of the line of levee in this District, with regard to grade, is, at this time, about as shown in the following statement, viz:

PARISH	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Miles in Parish
Plaquemines	Miles 2.12	Miles 5.76	Miles 11.62	Miles 11.72	31.22
Percentages.....	7	19	37	37	

This District is fast nearing completion in spite of its limited resources. On account of favorable batture conditions, the United States Government has found it practicable to, in a number of localities, do extensive earthwork at low cost in times of high water by using the levee machine "Barataria" working from a barge, when it otherwise would be laid up. The State has assisted in furthering this economical and efficient arrangement by the construction, in advance of high water, of wooden revetments, on the levees where high water enlargement was contemplated. This accounts for the relatively large amount of revetment work constructed by the State in this District during the past two years.

10. *The Buras Levee District:* Composed of the alluvial lands subject to overflow on the right or West Bank of the Mississippi River, "in the Parish of Plaquemines, South of a line drawn from the lower line of Riceland Plantation to the limits of Harang Canal on Bayou Lafourche," extending to The Jump, and aggregating some 40,000 acres in area.

The District is included in the United States "Barataria District."

The length of the levee line in this District is 33.74 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of five members.

The domicile of the District is at Buras, Parish of Plaquemines, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions thereon.

Forced Contributions: Five cents per acre on all land susceptible of cultivation within the limits of the District; \$30.00 per mile of standard gauge of railroad; 25 cents per bale of cotton; 5 cents per ton of cane; 5 cents per sack of rough rice; 2½ cents per barrel of oysters; 2½ cents per bushel of esculents, and five cents per barrel of oranges.

The authorized bonded debt of the District, all of which is outstanding, is \$35,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$740,505.00 and \$759,903.00, respectively.

The amount and cost of the levee work done in the District during the past two years, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The State.....	1.05	1.51	70,959	\$15,981.90
The United States.....	2.57	0.56	143,345	19,812.92
Totals.....	3.62	2.07	214,304	\$35,794.82

In addition to the foregoing, the District has expended in minor repairs, high water expenses, and for the care, protection and preservation of its line of levees \$7,646.16; in protection work during high waters of 1912 and 1913, \$15,159.24 and \$735.49, respectively.

The condition of the line of levee in this District with regard to grade, is, at this time, about as shown in the following statement:

PARISH	0 to 1 Foot Above High Water	1 to 2 Feet Above High Water	2 to 3 Feet Above High Water	3 to 4 Feet Above High Water	Total Miles in Parish
Plaquemines	Miles 5.61	Miles 12.63	Miles 5.29	Miles 10.21	33.74
Percentages	16	39	15	30	

Practically all the levee line in this District is located in the Orange growing section of the Lower Coast. The high value of lands devoted to orchard purposes and the comparatively limited depth of tillable land, have operated against the location of a levee line as far back from the river bank as in the other Districts. The result is that the maintenance of a levee line so close to the river, exposed to the heavy swells from ocean-going steamers, imposes heavy expenditures in protective revetments. Considerable work of this character has recently been done by the State and the United States. It is gratifying to record that notwithstanding the continually increasing price of cypress lumber used in the construction of levee revetments, it has been possible to reduce the cost of this character of work materially, by change in the design. During 1908-1910, the State built 19,447 linear feet at prices ranging from \$1.00 to \$1.44 per linear foot, with an average price of \$1.069 per linear foot. During the period 1910-1912, 9,040 linear feet were built at prices ranging from \$1.20 to \$1.47 per linear foot, with an average price of \$1.373 per linear foot. During the present period 1912-1914, the State has built 10,779 feet, ranging in prices from .96 to .7087 cents per linear foot with an average price of .805 cents per linear foot.

11. *The Plaquemines Parish East Bank Levee District:* Consists of all the territory contained within the Parish of Plaquemines, on the left or East Bank of the Mississippi River, beginning at the upper line of Harlem Plantation and extending to

the upper bank of Cusilich Canal, on the property of Peter Cusilich, below the Old Quarantine Station. It is entirely included within the limits of the Lake Borgne Basin Levee District and the Grand Prairie Levee District, so that all parts of it are also parts of another Levee District. In this respect, as well as having been constituted "for the purpose of protecting the lands of said District from inundation from the waters of the Gulf of Mexico," the Plaquemines Parish East Bank Levee District differs from any of the Levee Districts of the State previously created.

The length of the levee line in this District, including the seven side levees, is 36.3 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of five members.

The domicile of the District is at Pointe-a-la-Hache, Parish of Plaquemines, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem of "10 mills on the dollar of the assessed valuation" of the District. Should this tax prove inadequate, the District is further permitted "to levy annually a District Tax not to exceed 50 mills on the dollar, on its assessed valuation," provided, "that the said Board of Commissioners shall, in accordance with Article 239 of the Constitution of 1898, first submit, without any previous petition, the purpose for the proposed increased levy, and the length of time the same shall be levied, to a vote of the property taxpayers of said District," etc.

Forced Contributions: One Dollar per acre on all lands in the District protected from inundation, lying between the Mississippi River and the Gulf Coast Levees; \$30.00 per mile of standard gauge railroad; 25 cents per bale of cotton; 10 cents per barrel of sugar; 35 cents per hogshead of sugar; 5 cents per barrel of molasses; 5 cents per barrel of rough rice; 3 cents per barrel of vegetables and fruits other than oranges; 5 cents per barrel of oranges.

The authorized bonded debt of the District, all of which is outstanding, is \$155,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$244,020.00 and \$281,820.00, respectively.

The amount and cost of levee work done in the District, during the past two years by the State, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The State.....	0.31	2.68	31,521	\$6,412.48
Total.....	0.31	2.68	31,521	\$6,412.48

In addition to the foregoing, the District expended for repair, materials, weed cutting, etc., the sum of \$2,314.11.

12. *The Caddo Levee District:* All alluvial land, and all lands subject to or liable to overflow from the waters of Red River, or its tributaries, or its outlets, situated in the Parish of Caddo, not including such lands as occur within the corporate limits of the City of Shreveport, are embraced within the boundaries of this District, aggregating some 145,000 acres in area.

The length of the levee lines in the upper and lower Systems of this District aggregate 89.0 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of seven members.

The domicile of the District is at Shreveport, Louisiana.

The District levee taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial land subject to overflow in the District, and possessions thereon.

Forced Contributions: Five cents per acre on all land within the District; \$60.00 per mile of railroad; and 50 cents per bale of cotton.

The authorized bonded debt of the District is \$300,000.00, of which—from such information as is at this time available—something less than \$100,000.00 is, at this time, outstanding.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$1,223,469.00 and \$1,088,924.00, respectively.

The amount and cost of levee work done in the District during the past two years, by the District, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	11.29	14.08	1,504,413	\$254,605.83

The Levee System, both above and below Shreveport, in this District, is, at this time, in better condition generally than ever before. The augmented resources of the District, derived from leases, royalties, etc., on its gas and oil holdings, have enabled it to undertake work under contemplation for many years, but which it could not previously afford.

Some of this work has already been completed, other parts are in course of construction, while the greater part has not yet been provided for.

The very first requisite of the District is, of course, levees—good, strong, well-built levees—constructed with the proper factor of safety, and protected against any reasonable threat of failure. With this idea in view, the District has, within the past two years, completed the raising and enlarging of the line from the head of the System above Shreveport, at Blanton Bluff, Arkansas, down to Dooley Bayou, a distance of about 19 miles. This length of line has, within the last few years, been subjected to increased flood heights resulting from the confinement of the river in Arkansas by levees, and is subject to still further increment in flood heights when the North Bossier Levee District constructs its System. The work performed consisted of river

side enlargement, constructed to a grade five feet above the highest water of record (that of 1908), with side slopes of three horizontal to one vertical, and a crown ten feet wide. The District contemplates the continuance of this standardization of its System from Dooley Bayou down to Shreveport, and from Bayou Pierre, below Shreveport, to the lower limits of the District.

Wherever caving, in anything like an aggravated form prevails, the District proposes also to, as far as its resources may permit, and local conditions justify, provide adequate bank protection.

The plan adopted specifies that the new bank be properly sloped, then faced above low water stage with reinforced concrete, and below low water stage with a subaqueous timber mattress loaded with stone and extending well out into the channel of the river. Practically all of the caving reaches, within the limits of the District, which are at all seriously threatened by caving have already been placed under contract for protection, and two contracting firms are now engaged upon the work. One firm has Havana Reach about 50 per cent. completed, and Missionary Reach about 2 per cent. completed; while the other has only just started the work at Twelve Mile Bayou Reach.

A project which has been temporarily halted by injunction, brought in the Federal Court, by certain claimants to lands through which the proposed improvements are designed to pass, is the extension of the Levee System across Twelve Mile Bayou, on down to Cross Bayou opposite the City of Shreveport. This extension has actually been completed, with the exception of the diking of Twelve Mile Bayou itself. Before the closure of Twelve Mile Bayou by this dike can be permitted, provision must be made for diverting the waters of this Bayou from that part of its present channel near Red River, into and through another channel, which, when improved and made available, will discharge into Cross Bayou. Cross Bayou, in turn, flows into Red River immediately above Shreveport, some five miles further down stream than the point at which Twelve Mile Bayou now discharges into Red River. This project, when completed, will aid in the protection of a large area of land not previously so favored, by lowering the stage of back-water over the lower end of the District above Shreveport several feet. It will afford greatly improved drainage opportunities for a considerable area of very valuable

land, and, at the same time, should in no manner conflict with the consummation by the United States of the long agitated project for improving navigation, between Jefferson, Texas, and Shreveport, Louisiana.

Another project which has been halted after the contract had been awarded, was that of "Improving Drainage from the Big Willow Pass to Albany Falls." In this case authority to proceed with the work was refused by the Secretary of War, on the ground that the lowering of the water in Big Willow Pass, as a result of this work, would injuriously affect the dam constructed by the Government at the foot of Ferry Lake, unless said dam was specially remodeled and reinforced to stand the new conditions imposed. The cost of strengthening this dam was estimated at about \$60,000.00, and the District was called upon to meet same; but, rather than contribute \$60,000.00 towards removing objections to a project which itself was only estimated to cost \$40,000.00, the District decided to await the result of an application to Congress itself for the necessary appropriation.

However, other projects for improving drainage have been undertaken in the District. Kelly Bayou, from its head near the Arkansas Line, down stream for a distance of some 8 or 9 miles to a point where it empties into Scott's Slough, is now being improved. The Drainage System of which Kelly Bayou forms only the upper part, is in need of improvement here and there, all the way down to Shreveport, and the District contemplates doing the work as rapidly as funds become available.

Below Shreveport, a contract has been let to improve drainage in Bennett's Pass of Bayou Pierre. This is not a large contract in itself, but there are a number of places in Bayou Pierre where the raft still exists and where improvements should be provided to meet present conditions. Should Cross Bayou ever be closed and the drainage from the District above Shreveport diverted through Shreveport into Bayou Pierre, Bayou Pierre would need considerable improvement at a number of places. This project has not heretofore been seriously considered, due to its magnitude, but apparently possesses genuine merit and may be well worth serious consideration whenever the District feels able to undertake work of this character.

13. *The North Bossier Levee District:* All the alluvial lands subject to overflow from the waters of Red River or its tributaries or outlets, in the Parish of Bossier, bounded on the North by the Arkansas-Louisiana State Line, on the East by the hills or uplands, and on the South by the Southern boundary of Section Nine (9), Ten (10) and Twelve (12) of Township Twenty-two (22) North, Range Fourteen (14) West, and on the West by Red River, are embraced within the boundaries of this District, aggregating some 20,000 acres in area.

The control and management of the District is vested in a Board of Commissioners, consisting of five members.

The domicile of the District is at Plain Dealing, Bossier Parish, Louisiana.

The District levee taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: A District Levee Tax of 10 mills on the dollar of the assessed valuation of all the property in the District subject to taxation for levee purposes.

Forced Contributions: Fifteen cents per acre on all land; \$100.00 per mile of railroad lines; \$1.00 per bale of cotton.

The authorized bonded debt of the District, none of which is as yet outstanding, is \$200,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$27,750.00 and \$28,330.00, respectively.

No levee work has yet been undertaken in this District, by the District or the State, due to the fact that its Board of Commissioners is waiting upon the extension and completion of the proposed line of levee in Arkansas down to the State Line. The North Bossier Levee District, owing to its location and geographical configuration, naturally forms the lower end of a Levee District which should have its head at Long Prairie, in Arkansas, and its lower end at Posten Bayou, in Louisiana. But the fact that part of the District was in one State and part in another, precluded the practicability of forming it into one Levee District. This was especially so as that part in Louisiana (the lower end) is much smaller. An understanding has, however, been reached to the effect that just as soon as the Arkansas District completes a continuous System from the highlands at Long Prairie down

to the Louisiana Line, the North Bossier Levee District will take up the work and continue the levee on down as far as its resources will permit.

This condition has not yet been brought about.

14. *The Bossier Levee District:* All alluvial lands subject to or liable to overflow from the waters of Red River, or its tributaries or outlets in the Parish of Bossier, South of the line dividing the North half from the South half of Township 29 North, are embraced within the boundaries of the District, aggregating some 130,000 acres in area.

The length of the levee line in this District is 48.0 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of seven members.

The domicile of the District is at Bossier City, Bossier Parish, Louisiana.

The District Levee Taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all alluvial lands subject to overflow in the District, and possessions thereon.

Forced Contributions: Five cents on every acre of land in the District; \$60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the District is \$400,000.00, of which about \$350,000.00 is, at this time, outstanding.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$1,864,049.00 and \$1,943,283.00, respectively.

The amount and cost of the levee work done in the District during the past two years, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The State.....	2.77		196,047	\$29,711.97

In addition to the foregoing, the District has expended for minor repairs, etc., the sum of \$1,821.13, classified as follows:

Repair work, weed cutting, etc., \$1,609.63; drainage canals and ditches, \$211.50.

Much better care is now being taken of the levees in this District than heretofore. A regular force has been placed at work repairing all places which had been injured by abuses, and the System may be said to be, at this time, in generally good condition.

The caving in the reach opposite Taylortown, which had, for some years past, been threatening the levee and the big dikes there, has been arrested through the occurrence of a "cut-off" across Long Point, opposite, effected several months ago during a moderate rise in Red River. A serious condition at this point in the Bossier Levee District has thus been averted, at a comparatively small cost, \$10,728.99, considering the extent of the interests at stake.

All the work undertaken in this District since the Fall of 1908, has been done by the State, the District funds having been wholly absorbed by high water expenses in 1908, and by the great amount of work rendered imperative immediately thereafter.

15. *The Red River, Atchafalaya and Bayou Boeuf Levee District*: Under the Act of incorporation of this District, all the territory in the Parishes of Rapides and Avoyelles, and in that part of the Parish of St. Landry, situated between the Atchafalaya River on the East, and Bayou Boeuf and Courtableau on the West and South, was subject to its operations. This area aggregated some 945,000 acres.

During the years 1890 and 1891, however, by due process of law, all that section of Rapides Parish, above Alexandria, bounded by Bayous Rapides and Jean de Jean and Red River, and all parts of the Parish of Avoyelles, situated on the left bank of Red River, as well as that part of the Parish bounded by Bayou des Glaizes, the Atchafalaya and Red Rivers, and the public road running from David's Ferry on Red River, to "Long Bridge," at Bout de Bayou, have been exempted from the operations of the Act of incorporation of the District.

The acreage of the District, subject to the operation of law, is, therefore, at this time, only about 680,000 acres.

The lengths of the lines of levees in the three Systems in this District aggregate 130.7 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of three members, one from each Parish in the District.

The domicile of the District is at Alexandria, Louisiana.

The District levee taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar on all lands and other property in the District subject to taxation for levee purposes.

Forced Contributions: Five cents per acre on all land in the District; \$60.00 per mile of railroad.

The authorized bonded debt of the District, all of which is outstanding, is \$500,000.00.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$8,249,485.00 and \$9,889,490.00, respectively.

The amount and cost of the levee work done in this District, by the District, the State and the United States, during the past two years, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Levee Raised and Enlarged		
The District	10.61	19.85	1,341,835	\$256,025.67
The State.....	1.09	8.88	298,999	74,157.83
The United States.....	1.22		192,270	54,604.75
Total.....	12.92	28.73	1,833,104	\$384,788.25

In addition to the foregoing, there has been expended by the District for minor repairs, etc., and high water expenses, the sum of \$34,072.11, classified as follows: Repair work, weed cutting,

etc., \$2,934.56; high water expenses 1912, \$14,453.45; high water expenses 1913, \$15,746.79, and high water expenses from 1913 to April 1, 1914, \$937.31.

The amount and cost of the levee work still remaining, at this time, under existing contracts, to be done in the District, is as follows:

By the District.....	498,000 cubic yards	Amt'ing to \$112,050.00
By the State.....	85,623 cubic yards	Amt'ing to 17,124.60
Total.....	583,623 cubic yards	Amt'ing to \$129,174.60

This work is located as follows: On the Guillot New Levee on Red River now being built by the State, under a contract with the Board of Control of the Louisiana State Penitentiary; on the Lower Alexandria Front Section of the Iron Mountain Railway Crossing to Hynson's Contract, and in the Simmsport to Atkins Bayou Contract. This latter contract comprehends a total of about 850,000 cubic yards, of which 352,000 cubic yards have already been placed in position, and the balance is to be applied here and there along the Atchafalaya as may be directed by the Engineer in charge.

A serious condition has developed on the Atchafalaya River which extends from a point about a mile below the Frisco Bridge up to Elba, a total distance of about 18 miles. Whether the crevasses at Atkins Bayou and McCracken Bayou in 1912 and at Coville's in 1913, caused the main channel to fill up to such an extent as to congest the river, or whether a reduction in section caused by the willow and rock sill under the Frisco Bridge is responsible, has not been definitely determined; but, that something of the sort has occurred is evidenced by a most pronounced elevation of the flood stages within the limits of the stretch mentioned above. The extension of the Levee System down stream can hardly be charged with the entire trouble, as the extension has, so far, been negligible. Neither could the diking of Bayou Alabama be held responsible for it, as the main channel of the river below there seems easily able to carry off all the water reaching it.

The crevasse at Alto in 1912, was too far up the river to have exerted any influence so far down.

Urgent efforts are being made to enlarge the levees along this stretch to meet the new requirements, but an effort should be made to determine and correct the cause of the trouble.

Another matter which is quite discouraging to this District, particularly its lower end on the Atchafalaya, is the recent adoption by the Atchafalaya Basin Levee District of a policy abandoning the extension of its Levee System on the West Bank of the Atchafalaya River, continuously down stream, near the main bank of the river proper, in favor of rear protection levees along the properties facing the East Bank of Bayou Teche.

This will enforce the continuance of a gap at the lower end of the Red River, Atchafalaya and Bayou Boeuf Levee District at and near Bayou Courtableau. This new Interior System extending from near Port Barre along the lower side of Bayou Courtableau, and thence in a Southerly direction, near and paralleling the East Bank of Bayou Teche, will continue to relegate the lower end of the Red River, Atchafalaya and Bayou Boeuf Levee District to overflow, and afford no protection to the rich bottom lands between the Atchafalaya River and Bayou Teche.

16. *The Red River and Bayou des Glaizes Levee and Drainage District:* All lands in the Parish of Avoyelles, situated between Red River, the Atchafalaya River, Bayou des Glaizes and the public road running from David's Ferry or Moncla's Ferry, on Red River, to Bayou des Glaizes, by way of Marksville, Mansura, and the "Long Bridge" at Bout de Bayou, subject to overflow, are included in this District, aggregating some 150,000 acres in area.

The length of the levee line in this District is, at this time, 27.2 miles.

The affairs of the District are conducted by a Board of Commissioners of three members.

The domicile of the District is at Marksville, Avoyelles Parish, Louisiana.

The District levee taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar upon all of the property in the District subject to taxation for levee and drainage purposes.

Forced Contributions: Five cents per acre on all land in the District; \$60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the District is \$300,000.00, all of which is, at this time, outstanding.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$604,010.00 and \$696,250.00, respectively.

The amount and cost of the levee work done in this District during the past two years, was as follows:

WORK DONE BY	Miles of New Levee Built	Cubic Yards of Earthwork	COST
The State.....	0.74	66,849	\$12,722.88

In addition to the foregoing, the District expended for high water expenses of 1912, \$393.19.

The condition of the levees in this District, as far as they now extend, is good, except that the dike across Lake Long which was breached during the high water of 1912, has never been rebuilt. This virtually reduces the length of the levee line, so far undertaken, by about five miles. Several other breaks in the levee which occurred in 1912, above Lake Long were promptly repaired by the United States Government. The District has exhausted its resources with the major part of its Levee System still unbuilt. Until the Red and Atchafalaya Rivers are separated from the Mississippi River, this District cannot hope to provide any reasonable measure of protection to the greater part of its area.

At Ben Ruth Lake the State recently reconstructed the levee line there, moving it back about 100 feet. This will tide the danger at that point over another year or two; but unless the bend be protected by revetting, the ultimate loss of the levee there, and the presence of a permanent gap must follow. This is due to local conditions which preclude the further retirement of the line of levee, the entire area back of it being occupied by a Lake.

It is a case where bank protection work alone seems to promise to be equal to the emergency. This is absolutely beyond possibility for the District or State.

It is sincerely to be hoped that the United States Government may, before it be too late, be interested in going to its rescue.

17. *The Saline Levee and Drainage District:* All the territory in the Avoyelles Parish, consisting of the alluvial lands subject to overflow within the following limits, is embraced within the District, to-wit: Beginning at Cassandria on the line between Sections 44 and 50, Township 3 North, Range 3 East, thence down Red River to Saline Bayou, thence following Saline Bayou, Saline Lake and Horse Pen Creek to line between Sections 17 and 18, Township 4 North, Range 3 East, thence South to the Point Maigne Hills, and following the East edge of said hills to the point of beginning, aggregating some 40,000 acres in area.

The length of the line of levee in this District is, at this time, 10.3 miles.

The affairs of the District are conducted by a Board of Commissioners, consisting of three members.

The domicile of the District is at Marksville, Avoyelles Parish, Louisiana.

The District taxes and forced contributions permitted by law to be annually levied and collected in the District, are as follows, viz:

Tax: Ad valorem tax of 10 mills on the dollar upon all the property in the District subject to taxation for levee and drainage purposes.

Forced Contributions: Five cents per acre on all lands in the District; \$60.00 per mile of railroad; 50 cents per bale of cotton.

The authorized bonded debt of the District is \$300,000.00, of which \$100,000.00 is, at this time, outstanding.

The assessed valuation of the District, on the tax rolls of 1912 and 1913, was \$98,530.00 and \$118,570.00, respectively.

The amount and cost of the levee work done in the District during the past two years, was as follows:

WORK DONE BY	Miles of		Cubic Yards of Earthwork	COST
	New Levee Built	Enlarge- ment		
The State.....	0.16	3.79	145,186	\$22,988.56

The amount and cost of levee work still remaining, at this time, under existing contracts, to be done in the District, is as follows:

Schoolhouse South Extension, about 6,200 feet of enlargement, estimated to contain about 40,000 cubic yards, and to cost about \$7,000.00.

This work is located at a point about 7 miles below the head of the System, and makes this line of levee continuous to a point about $3\frac{1}{2}$ miles from its lower end.

The condition of the levees in this District is generally good, but some further work is demanded in order to secure the lower end. The line should, in fact, be extended down stream to a better terminus.

GENERAL SUMMARY OF CONDITIONS AFFECTING THE LEVEE
SYSTEM ON THE MISSISSIPPI, RED AND ATCHAFALAYA
RIVERS IN LOUISIANA.

ON THE MISSISSIPPI RIVER.

The condition of the lines of public levee in the several levee districts in Louisiana, fronting on the Mississippi River, as already set forth, under the name of each district, continues to show material improvement in location, grade, cross-section, character and quality of work performed.

Thus, it may be authoritatively stated that, while, along parts of the system, on the Mississippi River, in Louisiana, much still remains to be accomplished before the system may, as a whole, be regarded and classed as in all respects adequate, it requires at this time, less to be done to it and expended upon it to standardize it than at any time in the previous history of the river.

In fact, if the proposed standardizing of the levee system is now possible, within the time and the expenditure recently estimated and advanced by authorities on the subject, it is due to this continued material improvement, under the direction of those who have so far directed operations, thereby providing, as it has, the foundation for ready procedure, supported by the confidence felt by the riparian dwellers of the valley in the efforts so far made.

A great deal is, from time to time, heard about the "failure of the levee system," and the need of new methods and system to

correct this. Such a statement is in no way just. There has so far never been a time when the levee system as a comprehensive whole has really and truly had a fair chance, the most far reaching ideals heretofore tentatively conceived in regard to it having ever to be formulated on the order of "cutting the garment to fit the cloth." It should, therefore, in itself, not be charged with failure. But the system which *has* proved a failure, is that which left the unjust burden of extending and maintaining the "levee system" practically solely upon the people of the deltas.

Then as to the need of new methods and treatment, this remains to be proved, and, until proven, this Department, supported as it is by the opinions of the best experts on the subject, must continue to record itself as an adherent to the "all levee system" for the Lower Mississippi River. In its mind, it requires only the means with which to revet banks, and to build the levees to proper grades and sections, on properly located and prepared lines, to solve the problem. Outside of the physical objections and impracticability emphasizing the inefficiencies, if not positive injuries resulting from the numerous theories being from time to time advanced—reservoirs, outlets, waste weirs, spillways, etc.—as sources of relief from excessive flood heights, the eminently practical side of the proposition is to be found in the fact that the valley, as a whole, will never be satisfied with anything less than the total exclusion of its surplus waters from its vast and fertile expanses of alluvial lands, and nothing but levees will ever accomplish this.

This leads to the question of further Government aid and control, about which there should be no doubt in the minds of any as to the obligation of the Government, in which connection, the Board of State Engineers desires to herein again emphasize its previous often repeated accord in the premises.

Outside of the financial necessities of the proposition, in which the responsibility of the National Government has been practically admitted and established in all directions, national, local, commercial and otherwise, as long as the banks of the Mississippi River, along its numerous concave bends, are, season after season, permitted to crumble in and carry away long lines of levee, no matter how well previously located, nor how ideally constructed,

to thereby destroy vast areas of property, and render the stupendous problem of maintaining, along certain long reaches on the Upper River, proper depths of water for navigation as well, the end of its requirements will never be in sight.

In what direction can the riparian dwellers, and the shipping and commercial interests of the valley possibly look for resources with which to cope with and conquer this enemy to all their vast interests but the National Government?

Besides this, from the economic point of view, bank protection work may be said to become more and more imperative in proportion to the degree of improvement accomplished in the levee system itself. The higher the standard to which the levees are constructed, the greater the calamity and loss when destroyed by caving banks.

Bank protection proper is generally a more serious and far reaching proposition to what is commonly called the "Upper River," that is, on the Mississippi River above the mouth of Red River, than to the "Lower River." However, the latter, too, is subject to similar attack in a number of localities, demanding, in no small measure, equal recognition in adjusting conditions on the river as a whole.

On the "Lower Coast," or that part of the Mississippi River below New Orleans, materially receding banks are, comparatively speaking, of much less frequent occurrence than above, but another form of exposure in high water confronts the river banks and levees on both sides of the river practically the greater length of the river from New Orleans to the Gulf of Mexico.

This results from waves caused by winds and storms, and by the numerous large ocean-going vessels plying up and down that part of the river.

The lines of public levee, along this part of the river, therefore, should and are being generally, where so exposed, and where it may be practicable and the means may be available, protected by either wooden revetments or by a facing of concrete.

ON RED RIVER.

The length of Red River in Louisiana, that is, from the Arkansas State Line to Old River, is 367.0 miles. Of this length, however, but 250.0 miles, distributed between both banks, has so far

been leveed by the authorities; that is, 101.0 miles by river, in the Caddo Levee District, on the right bank; 61.0 miles in the Bossier Levee District opposite, on the left bank; 75.0 miles in the Red River, Atchafalaya and Bayou Boeuf Levee and the Red River and Bayou des Glaizes Levee and Drainage Districts, on the right bank, and 13.0 miles in the Saline Levee and Drainage District opposite, on the left bank. That is, the upper and lower limits of Red River only have so far received the benefits of levee construction by the State and the Levee Districts, leaving several long stretches of river, and adjacent country in between, where protection from overflow would prove of immense value, still untreated. This is largely due to the fact that riparian owners in this section have not yet availed themselves of the opportunity permitted under the laws of the State to organize into Levee Districts and obtain the benefits of State aid, to which they would thereby be entitled. Much levee work is, therefore, still needed on Red River.

Except for some lack of system and comprehensiveness, in the work of the local authorities, here and there, on Red River, in preserving, caring for and maintaining their lines of levees, the latter are, as far as they extend, in good and effective condition.

Red River, like the Mississippi River, also suffers greatly from caving banks. This condition is intensified by its extreme tortuousness, numerous cut-offs, steepness of slope, and, where confined, to the enlargement of section consequent upon confinement.

In this connection, it is gratifying to be able to record that the Caddo Levee District, realizing to what a serious extent the interests of navigation, the preservation of its lines of levee, and the protection of its riparian lands were affected by this ever recurring menace, has undertaken to treat the most aggravated caving parts of Red River, within its limits, with bank protection work.

This is recognized as a bold step, but in the right direction, of course, only rendered possible by the materially increased resources of the District through the bonuses and royalties being of recent years received from its oil and gas properties, as already explained.

With such a good example as this already set locally, it would appear that the National Government should not much longer

fail to accord consideration of this important factor in river control on Red River, as well as the numerous other features connected with the development and preservation of Red River as a water-way in Louisiana and elsewhere in the Valley to the extent even of enacting laws to create a National Red River Commission, along the same lines as govern with the Mississippi River Commission.

No comprehensive plan of operation for the benefit of the Valley as a whole can well be ever otherwise formulated and carried out, and without such a plan, not only will no material advance in public improvement in the Valley as a whole, be likely, but comparatively speaking, much of the work here, there and elsewhere, spasmodically done, as occasion permits, with meager resources, national and local, will continue to be subject to certain waste, through efforts, necessarily more or less tentative and lacking in sequence. Many plans which, for the time being, may appear, locally, appealing, may equally prove seriously conflicting to the Valley at large, when, if ever, the attempt might be made to assemble them into one grand whole.

ON THE ATCHAFALAYA RIVER.

The Atchafalaya River, from its head, at Barbres Landing, to its mouth, at the Gulf of Mexico, has a length of about 160 miles. Of this, but 41.0 miles, on the right or West Bank, from Simmsport to and across Bayou Bigraw, and 45.5 miles, on the left or East Bank, by river, have so far been leveed.

The levees so far built on the Atchafalaya River, are at this time, with few exceptions, in excellent condition, to guard against such high waters as have so far visited that stream.

However, along that part of its length, extending from a point at or near Elba, to a point at or near the Frisco Railroad Crossing, due to obstructions, natural and otherwise, a more congested condition in high water seems to follow with each succeeding season, which, unless soon relieved by the removal of such obstructions and the enlargement of the stream by confinement may, at times, still call for strenuous action on the part of the levee authorities to maintain these lines of levee.

Since the last biennial report of the Board of State Engineers, the Atchafalaya Basin Levee District has practically abandoned, for the time being, and, in fact, for the near future, the extension of its lines of levee on the Atchafalaya River, as recommended and approved by the Board of State Engineers, and, upon its own responsibility, substituted therefor, at least for that part of the District bordering on the West Bank of the Atchafalaya River, South of Bayou Courtableau, a policy to construct rear protection levees along the Eastern boundaries of properties located on the East Bank of Bayou Teche.

Proposals for the construction of Sections 1 and 2 of this proposed line of levee, about 22 miles in length, upon a location selected by the Atchafalaya Basin Levee District, and involving some 600,000 cubic yards of earthwork, were received and opened by the Board of Commissioners of the District, through its President, on April 8th, resulting in the award of a contract for its construction to the Board of Control of the Louisiana State Penitentiary (convict forces) at a price of 17.45 cents per cubic yard, work to begin within sixty (60) days from the date of the award, and be completed on or before April 15th, 1916.

On the other hand, the Red River, Atchafalaya and Bayou Boeuf Levee District, though more than anxious to, at as early a time as practicable, extend its line of levee on the West Bank of the Atchafalaya River to a point at or near the mouth of the Bayou Courtableau, the lower limit of that District on the Atchafalaya River, has found itself, on account of the absence of resources, unable to add anything to the length of this part of its system since 1911.

SEPARATION OF THE RED AND ATCHAFALAYA RIVERS FROM THE MISSISSIPPI RIVER.

The conduct of Old River and the Atchafalaya River, and the high waters visiting them and the Mississippi River, during the past two years, leads the Board of State Engineers, to reiterate the direct opinion, expressed in its two previous biennial reports, that provision being assured to satisfy any new conditions thereby imposed the proposed separation should not be delayed any longer than can possibly be avoided.

A failure to effect the exclusion of the waters of the Mississippi River, through Old River, and the gap in the Levee System above, from the lower Red River and the Atchafalaya River Basins, must from the point of view of protection from overflow, drainage and reclamation, operate to an almost prohibitive degree, against the successful development, upon anything like comprehensive and economic lines of that section of the State.

It is sincerely to be hoped that the benefit of the investigations of the Mississippi River Commission, to which body the solution of the question has been entrusted, may soon be enjoyed by the public.

BAYOU LAFOURCHE.

During the past two years, the Joint Organization of the Atchafalaya Basin and Lafourche Levee Districts, charged by law with carrying out certain projects for the improvement of Bayou Lafourche, has confined its operations to such dredging as was demanded to maintain a suitable channel for navigation by such craft as now ply upon that stream, to guarding against congestion by the water hyacinth, and to the maintaining of fresh water connection with Lake Verret.

In regard to the lock near the head of Bayou Lafourche, at Donaldsonville, revised plans and specifications for its construction, on less extensive and simpler lines than at first contemplated, are, at the request and at the expense of the Joint Organization, being, by courtesy, prepared under the direction of the U. S. A. Engineer in charge of the Division of the Gulf.

In the meantime, the dam at the head of the Bayou, authorized by the Secretary of War, pending the construction of a lock, will no doubt be permitted to remain. However, it should not be overlooked that this is, under all circumstances surrounding it, a great concession on the part of the National Government, and steps to adjust the situation to comprehensive and permanent lines should not be delayed any longer than can possibly be helped.

The project for permanently closing Bayou Lafourche at its head, at Donaldsonville, by a lock or dam continues in favor, the benefits to the entire section of the State contiguous to Bayou

Lafourche being manifold and convincing beyond the most sanguine expectations of its promoters.

With special reference to the dam at the head of the Bayou, owing to copious sillage at and in its vicinity, and numerous "boils" in the land slope, banquettes, etc., of the embankment proper, during each and every recurring period of high water, and even at stages of the river materially lower than high water, much anxiety and concern as to its safety and efficiency, under all conditions and circumstances, has been widely felt by those depending upon its integrity to insure the exclusion from Bayou Lafourche of high water in the Mississippi River.

Appreciating this fact, the State, during the high water of 1913, caused a row of corrugated interlocking steel sheet piling, forty-five feet in length, to be driven on a line paralleling the axis of the dam, and at a distance therefrom generally indicating the edge of its base on the river side, to serve as an intercepting wall to this sillage, if the source were located in that direction.

The penetration reached by this wall was generally as low as 8.8 C. D., or 11.5 feet below Mean Gulf Level, the minimum being 11.1 C. D., or 9.2 feet below Mean Gulf Level.

Much to the disappointment of those in interest, the result of this work was negative, and conditions apparently little if at all improved, inducing the State to further effort to discover the source of the trouble.

To this end, it was decided to construct a new dam, to the river side of the old dam, about on a line with the levees in the Atchafalaya Basin Levee District and Lafourche Levee District above and below, and to improve both of the latter for some distance above and below the Bayou proper.

In connection with the earthwork, the project, as finally revised, comprehended a line of sub-surface wooden interlocking sheet piling 16 feet long, the top of which was driven to an average elevation of 38 C. D., or about five (5) feet below the general surface of the ground, along the edge of the improved levee, and new embankment, upon which was superimposed a reinforced concrete curb six (6) inches thick, five (5) feet high, that is up to the general surface of the ground, followed by a reinforced

concrete facing or pavement, four (4) inches thick, on and up the slope of the new embankment to the net grade of the latter.

With the exception of some 400 feet in length of line, located over the upper half of the Bayou proper, this work, while not yet completed in all its parts, has progressed to a stage of comparative safety.

Over that part of the line referred to, the embankment at an early stage in its construction gave evidence of serious subsiding and sloughing, which continued to such an extent as to cause the State to satisfy itself for the time being with its partial completion, that is, to net fill, wide crown, and such slopes as would stand, and defer the facing or paving of the slope until the embankment be brought to a state of final stability at the height and section designed.

The work so far performed under this project has cost the State \$30,015.01, and it is estimated that as much as \$8,099.44 more will be required to complete it as a whole.

While, in the opinion of the Board of State Engineers the new work, even as it now stands, should give evidence of corrective effects, provided, of course, that the source of the sipage, etc., were from the river, through the mouth of the Bayou proper, the fact is not borne out.

On the contrary, the sipage through the older dam, and the activities of the boils on the slope and banquette of the dam, even at such stages so far reached this year, in the Mississippi River, at Donaldsonville, are practically as great as in the past for like stages, leading to the conclusion that the source of the trouble may not yet have been reached, but must be sought, by investigation and research, in some other direction, at this time pointing to conditions possibly existing above Bayou Lafourche, in the Atchafalaya Basin Levee District.

It must not be inferred from this explanation, that a failure of the line of protection across the head of Bayou Lafourche is in any way more imminent than heretofore. On the contrary, though the conduct of the older dam has not been improved upon, the new work in front of it is in excellent condition, and evidencing none of the unsatisfactory symptoms of the older line of defense.

HIGHWAYS.

So greatly has interest in the good roads movement in Louisiana continued, during the past two years, to grow, and, considering the meagre resources available, so extended has been the submission and consideration of projects, and the advance made with them, that a special report from the State Highway Engineer, Mr. W. E. Atkinson, whose services the Board was fortunate enough to, as early as October, 1912, secure, to direct the affairs of its Highway Department, has, by request, been submitted by him, and, herein, follows in full, viz:

HIGHWAY DEPARTMENT
OF THE
BOARD OF STATE ENGINEERS
ROOMS 104-106
NEW ORLEANS COURT BUILDING.

NEW ORLEANS, LA., April 20, 1914.

*To The Board of State Engineers,
New Orleans Court Building,
New Orleans, Louisiana.*

Gentlemen:

I have the honor to submit for your information, the following report, with accompanying statements, covering the period from April 20th, 1912, to April 20th, 1914.

The Highway Department, Board of State Engineers, was created by Act 49 approved June 29th, 1910, and the enabling Act No. 14 of the same year provided revenues for the organization and operation of the Department.

Act 49 provides that the Highway Department be made a subsidiary department of the Board of State Engineers, and "To require the State Board of Engineers to assume control of State Highways under certain conditions; to elect a State Highway Engineer; to define his powers and duties; and fix his compensation; to authorize the construction and maintenance of highways by contract or by the Highway Engineer; to provide for the working of convicts on highways under certain regulations; to

authorize the acquisition, by expropriation or otherwise, of rights of way for highways, drainage canals, or ditches; to provide a revenue for carrying out the objects and purposes of this act, and to provide for the disbursement thereof; and to require the parishes, cities, towns and villages to contribute a certain proportion of the cost of constructing and maintenance of highways; defining a State Highway; and repealing all laws or parts of laws in conflict with this Act."

Act No. 14 is in the form of a joint resolution of the House and Senate, amending the Constitution of the State of Louisiana, and is self-executing without the necessity of an enabling act of the Legislature, and had effect from the date of its adoption. The tax it provides is a part of the general six and one-quarter mill State tax authorized to be levied by the Constitution.

The act authorized the levy and collection of one-fourth of one mill on the assessed value of all property in the State of Louisiana, for the creating of a road fund to construct and maintain State Highways.

Act 49 approved June 29th, 1910, and promptly promulgated, becoming effective during the Summer of 1910, but, as the road tax was not to be levied until the year 1911 and no revenues could be expected till then, it was not considered advisable to officially organize the Highway Department until the early part of 1911. Consequently, the highway work which had been inaugurated prior to the passage of Act 49, under the broad plan which his Excellency, Governor J. Y. Sanders, advocated and arranged, whereby the Federal Government, the State and the Parishes of the State co-operated, was continued under that arrangement up to February 1st, 1911.

The following statement shows the number, the location, the character, the length, and the cost of construction of the highway projects undertaken and completed under this arrangement up to February 1st, 1911:

RECAPITULATION OF ROADS CONSTRUCTED TO FEBRUARY 1, 1911,
WITH CONVICT LABOR, SHOWING LOCATION, CHARACTER,
MILEAGE, COST, AVERAGE COST PER MILE IN EACH PARISH,
TOTAL MILEAGE CONSTRUCTED, AND TOTAL COST.

PARISH	General Character	Mileage	Cost	Average Cost per Mile
Natchitoches.....	Earth	13.40	\$ 8,576.55	\$ 640.04
DeSoto.....	Sand-Clay	34.15	28,380.83	831.06
*Ouachita	{ 4¼ Miles Gravelled, 13 Miles Earth }	17.25	25,089.16	1,454.44
Rapides	Earth	3.57	3,273.50	916.94
East Baton Rouge....	Earth	19.19	15,965.44	831.96
Orleans.....	Earth	15.00	13,494.95	899.66
City of Baton Rouge	Wide Gravel	.82	5,023.08	6,125.71
Total.....		103.38	\$99,803.51	

* Ouachita Parish { Average cost 4¼ miles gravelled road \$3,196.58
 { Average cost 13 miles earth road..... 884.90

	Miles	Cost	Average Cost per Mile
Total Earth Roads Constructed.....	64.16	\$52,814.14	\$ 823.16
Total Gravelled Roads Constructed	5.07	18,608.54	3,670.32
Total Sand-Clay Roads Constructed	34.15	28,380.83	831.06
Total.....	103.38	\$99,803.51	

Average cost per mile of all roads constructed..... \$965.40

In reviewing the work of the Highway Department, Board of State Engineers, for 1912 and 1913, and the results accomplished, the attention is first held by the greatly increased interest in the subject of road improvement that is shown in nearly every section of the State. Evidence of the fact is best shown by the large number of public meetings to which the Highway Department has been requested to send a representative to discuss some topic connected with road improvement, and the greatly increased

number of inquiries and requests for information and the work accomplished by Police Juries and local road organizations.

The Highway Department, in all its work and discussions before the Farmers' Institutes and other meetings, has tried to make it clear that road improvement does not necessarily mean the construction of the highest type of roads, except under certain traffic conditions, but attention should be given to those methods by which the best results can be obtained with the money that is, or will be, available for the various highway projects.

CONCRETE BRIDGE AND CULVERT CONSTRUCTION.

The Department is of the opinion that reinforced concrete bridges and culverts are more economical and safer in the end than some cheaper form of construction having a large annual maintenance expense and upkeep, and therefore the Department has for the past year and a half, advocated and urged the construction of reinforced concrete bridges and culverts, where possible, on all State Aid Highways, and it is gratifying to note how rapidly many of the Road Districts and Parishes are concurring with the Highway Department in replacing the old wooden form of construction with that of more permanent and economical concrete structures. The Department has constructed and under construction, since April 20th, 1912, a total of 2,889 linear feet of reinforced concrete bridges, and 5, 740 linear feet of reinforced concrete culverts, the average cost being \$16.70 per cubic yard.

BULLETINS.

The Department, with the assistance of the Attorney General's Office, is preparing a book, which will be out of press in a few days, containing a compilation of the Road Laws of Louisiana; the method of applying for State Aid in the construction of highways, and a description of the various forms of State Aid obtainable from the State.

This book also contains information ordinarily required in the creation of road districts, issuance of bonds and voting special taxes, etc., for good road purposes in Louisiana. This information is given in detail and should encourage the issuance of bonds

for good road purposes, and eliminate, to a great extent, the issues of bonds which have been voted in the past and found to be faulty when attempts were made to negotiate them.

The Department has received many applications and requests from various Police Juries throughout the State for copies of this book.

HIGHWAY SYSTEM.

Due to the natural tendency of various Parishes to build highways along routes designated by them, irrespective in many instances, to the location of highways in adjacent Parishes, and without regard to a system of highways that would ultimately benefit the State as a whole, this Department adopted a system of proposed State Highways in June, 1913, copy of which appears in this report.

This system embraces the union of the respective parish-seats and principal trade centers with those of adjacent Parishes by model highways, in as direct a route as practicable.

The Department is pleased to state that the general plan as outlined in this system has been favorably received by Parishes contemplating the construction of State Aid Highways.

RECOMMENDATIONS.

The revenues from the one-quarter of one mill tax are the only revenues that this Department receives. This tax nets the Department approximately one hundred and twenty-five thousand dollars per year, which amount has been expended, since the organization of the Department, for highway construction, less the operating expenses of the Department.

The revenues being so limited, the Department is able to extend State Aid to only a small degree to the many Parishes applying for same, and then difficulty is experienced by reason of the inadequate amount apportioned to the various Parishes.

The Department therefore recommends that the one-fourth of one mill tax be increased to one mill.

The Department further recommends that a motor vehicle law licensing motor vehicles and chauffeurs be enacted. The revenues derived from same to be used for maintenance and construction.

The Department holds that the question of maintenance is equal in importance to that of construction, and should be done under State supervision. The Department, by reason of its inability to contribute its share towards the maintenance of State Aid highways after construction, has been forced to postpone action in this very important matter till such time as it is in position to secure funds for this purpose.

The Department has endeavored to have State Aid highways maintained by the Police Juries of the Parishes in which the highways were constructed, but has not been successful in this respect, and experience has shown that the local authorities can not, except in rare cases, be depended upon to maintain the State Aid highways after construction.

ORGANIZATION.

On February 1st, 1911, the Highway Department was officially organized, and such work as was still in the course of construction with State convicts, was taken over by the Highway Department. Act 49 of 1910 provided for the appointment of a Highway Engineer, but the Board of State Engineers deferred such appointment, and, by re-arranging the assignments of the members of the Board, made it possible to assign one of its members, Mr. Gervais Lombard, to act as Highway Engineer. On October 1st, 1912, Mr. W. E. Atkinson was appointed State Highway Engineer, and assumed charge of the Highway Department on that date.

The personnel of the Highway Department, as now constituted, is as follows:

W. E. ATKINSON, State Highway Engineer.

C. C. SANDOZ, Secretary.

C. M. KERR, Draftsman and Assistant Engineer.

E. G. SANDOZ, Assistant Draftsman.

CHAS. F. WOOD, Stenographer.

Enginner Assistants have been employed from time to time as conditions required. The present force of Engineer Assistants are:

W. H. NORCKAUER,
L. T. GILMER,
H. T. RICHARDSON,
T. S. SHIELDS,
H. C. DAIGRE,
A. A. LYONS,
A. D. LAMBERT,
E. J. C. BURROUGHS,
C. G. CAPPEL.

In the construction of State Aid highways, the Engineer Assistant assumes charge of all construction work and is the accredited representative of the Department.

The principal duties required of him are to see that the work is being carried out in a workmanlike manner, as per contract, plans and specifications; that only materials of first grade and those prescribed in the specifications are used; setting of slope and grade stakes for earth and metal work; computation of quantities; to keep a record of all materials used; to make weekly progress reports and an estimate each month of the work constructed, and all other details and requisites necessary for the proper and efficient construction as directed by the State Highway Engineer.

APPORTIONMENTS.

In order to allow all Parishes an equal opportunity to participate in the apportionment of State Aid Funds, the Department has adopted the custom of notifying all Parish Police Juries several months in advance of the date on which the State Aid Funds will be apportioned for that year. These communications are directed to the Presidents of the Police Juries of the various Parishes, and ample time is allowed to Parishes to qualify and secure State Aid. These communications also state the general requirements necessary for Parishes to qualify.

The apportionments are made among the Parishes that have applied and qualified before the date set for the apportionments, and are made according to the character and extent of the projects applied for. All apportionments made to Parishes and not accepted, revert to the General Highway Fund and are re-apportioned.

The following apportionments were made out of the revenues of 1913 and 1914:

APPORTIONMENTS MADE TO PARISHES BY THE STATE HIGHWAY
DEPARTMENT OF STATE AID FUNDS OUT OF THE
REVENUES OF 1913.

Lafayette	\$20,000.00
Madison	8,000.00
East Carroll	5,000.00
Iberia	6,000.00
East Baton Rouge.....	15,000.00
Caddo	10,000.00
Red River	10,000.00
Webster	8,000.00
Caldwell	10,000.00
DeSoto	8,000.00
Sabine	8,000.00
Bossier	15,000.00
Iberville	5,000.00
St. Tammany	5,000.00

APPORTIONMENTS MADE TO PARISHES BY THE STATE HIGHWAY
DEPARTMENT OF STATE AID FUNDS OUT OF THE
REVENUES OF 1914.

Bossier	\$25,000.00
Jefferson Davis	15,000.00
Tangipahoa	15,000.00
Natchitoches	5,000.00
Claiborne	5,000.00
East Baton Rouge.....	10,000.00
Caddo	5,000.00

Sabine	9,000.00
DeSoto	5,000.00
Madison	5,000.00
Jefferson	2,500.00
Plaquemines	2,500.00
Caldwell	5,000.00

The following proposals were received and contracts awarded by the Highway Department, Board of State Engineers, for the construction of State Aid highways, from April 20th, 1912, to April 20th, 1914:

JUNE 7TH, 1912.

GRANT PARISH.

Colfax—Montgomery Highways—Earth and sand-clay.

Section No. 1—Colfax to Montgomery.....	14 miles.
Section No. 2—Montgomery to New Verda.....	8 miles.
Section No. 3—New Verda to Colfax.....	16 miles.

Name and address of bidders:	Amount.
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L. B. Constant, Alexandria, La.:

Section No. 1.....	\$30,832.50
Section No. 2.....	14,037.50
Section No. 3.....	34,411.25

Awarded to L. B. Constant.

FEBRUARY 25TH, 1913.

SABINE PARISH.

Many—Fort Jessup Highway—11 miles—Earth and sand-clay.

Name and address of bidders:	Amount.
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C. S. Jackson & Co., Crowley, La.....	\$21,350.00
Jones & Wood, New Orleans, La.....	21,600.00

Awarded to C. S. Jackson & Co.

JUNE 2ND, 1913.

CADDO PARISH.

Mansfield Highway—5.8 miles—Gravel.

Name and address of bidders:	Amount.
Eagle Construction Co., New Orleans, La.....	\$51,802.50
Hammet, Kernard & Marston, Allendale, La.....	34,364.50
Healy Construction Co., Meridian, Miss.....	32,962.52
Neel & Ritchie, Camden, Ark.....	36,349.50
Boyd & Bradshaw, Columbia, Miss.....	38,591.00

Awarded to Healy Construction Co.

AUGUST 25TH, 1913.

SABINE PARISH.

Belmont—Sodus Highway—10 miles—Earth and sand-clay.

Name and address of bidders:	Amount.
Lester F. Alexander, New Orleans, La.....	\$26,280.00

Bid rejected and work undertaken by force account,
employing the Road Outfit owned by the State.

SEPTEMBER 8TH, 1913.

DESOTO PARISH.

Mansfield—Benson Highway—12 miles—Earth and sand-clay.

Name and address of bidders:	Amount.
Thos. F. Larkin, Sherman, Texas.....	\$21,867.00
Smith Brothers, Crockett, Texas.....	21,901.09

Awarded to Thos. F. Larkin.

NOVEMBER 10TH, 1913.

MADISON PARISH.

Tallulah—Lake Providence Highway—9 miles—Improved Earth.

Name and address of bidders:	Amount.
Nicholson & Jones, Lake Providence, La.....	\$19,941.00
B. D. Reilly, St. Louis, Mo.....	20,840.00

Awarded to Nicholson & Jones.

NOVEMBER 24TH, 1913.

CALDWELL PARISH.

Section Columbia—Rayville Highway—4 miles—Earth.

Across Lafourche Bottom.

Name and address of bidders:	Amount.
Nicholson & Jones, Lake Providence, La.....	\$23,242.00
B. D. Wood, New Orleans, La.....	20,222.00
Thos. F. Larkin, Sherman, Texas.....	23,092.00
F. C. Barbour, Shreveport, La.....	22,755.00
Healy Construction Co., Meridian, Miss.....	27,573.00

Awarded to B. D. Wood.

NOVEMBER 24TH, 1914.

LAFAYETTE PARISH.

Lafayette Parish Highways—16 miles—Gravel.

Name and address of bidders:	Amount.
G. W. Prutsman, Danville, Ill.....	\$50,643.50
Texas Grading Co., Houston, Texas.....	58,555.00
Ritchie & Co., Camden, Ark.....	64,283.50
Thos. F. Larkin, Sherman, Texas.....	68,645.00
Worthington Construction Co., Brookhaven, Miss.....	47,813.30
Nicholson & Jones, Lake Providence, La.....	52,484.00
Boyd & Bradshaw, Columbia, Miss.....	58,364.75

Awarded to Worthington Construction Co.

DECEMBER 17TH, 1913.

EAST BATON ROUGE PARISH.

Baton Rouge—Hope Villa Highway—14 miles—Gravel.

Name and address of bidders:	Amount.
Linnan Brothers, New Orleans, La.....	\$44,058.40
G. W. Prutsman, Danville, Ill.....	35,978.80
Geo. W. Garig, Baton Rouge, La.....	38,528.00
Boyd & Bradshaw, Columbia, Miss.....	43,360.20
Worthington Construction Co., Brookhaven, Miss.....	40,637.12

Awarded to G. W. Prutsman.

JANUARY 5TH, 1914.

PLAQUEMINES PARISH.

Section No. 2—Pointe-a-la-Hache Highway.
.85 of one mile—Shell.

Name and address of bidders:	Amount.
Edward H. Trebes, New Orleans, La.....	\$2,854.50
Awarded to Edward H. Trebes.	

FEBRUARY 2ND, 1914.

IBERIA PARISH.

New Iberia—Lafayette Highway—4.6 miles—Improved Earth.

Name and address of bidders:	Amount.
Henry J. Bonnabel, New Orleans, La.....	\$11,766.90
Lower Coast Construction Co., Pte.-a-la-Hache, La.....	10,256.50
W. E. Geren, Remi, La.....	10,176.00
Awarded to W. E. Geren.	

MARCH 16TH, 1914.

EAST CARROLL PARISH.

Section No. 3—East Carroll Parish Highways.
6.5 miles—Improved Earth.

Name and address of bidders:	Amount.
S. K. Jones, Tallulah, La.....	\$ 7,960.00
Boyd & Bradshaw, Columbia, Miss.....	8,700.00
H. J. Bonnabel, New Orleans, La.....	8,400.00
A. K. Amacker, Lake Providence, La.....	6,600.00
F. T. Constant, Alexandria, La.....	14,400.00
Lower Coast Construction Co., Pte.-a-la-Hache, La.....	9,013.80
C. W. Cooper, Natchez, Miss.....	7,560.00
Awarded to A. K. Amacker.	

APRIL 3RD, 1914.

CADDO PARISH.

Arkansas Highway—5 miles—Gravel.

Name and address of bidders:	Amount.
W. P. Ritchie, Camden, Ark.....	\$16,775.00
J. N. George & Sons, Joaquin, Texas.....	22,272.00
Healy Construction Co., Meridian, Miss.....	19,108.00
Henry J. Bonnabel, New Orleans, La.....	18,640.85
Thos. F. Larkin, Sherman, Texas.....	19,778.40
Caddo Engineering Co., Shreveport, La.....	24,612.90
S. A. Gano, Jackson, Miss.....	19,960.00
Awarded to W. P. Ritchie.	

STATEMENT SHOWING MILEAGE OF GOOD ROADS CONSTRUCTED
WITH CONVICT LABOR, COST OF SAME AND COST PER
MILE FROM APRIL 20, 1908, TO APRIL 20, 1914.

PARISH	General Character	Mileage	Cost	Average Cost per Mile
*Natchitoches	Earth	37.23	\$ 29,021.01	\$ 779.51
†DeSoto	Sand-Clay	50.39	43,797.59	869.17
§Ouachita	$\left\{ \begin{array}{l} 4\frac{1}{4} \text{ Miles} \\ \text{Gravelled, 13} \\ \text{Miles Earth} \end{array} \right\}$	17.25	25,089.16	1,454.44
Rapides	Earth	3.57	3,273.50	916.94
†East Baton Rouge	Earth	22.22	23,400.53	1,053.13
Orleans	Earth	15.50	16,110.11	1,039.36
City of Baton Rouge	Wide Gravel	.82	5,023.08	6,125.71
St. John the Baptist	Earth	8.00	7,200.00	900.00
Total		154.98	\$152,914.98	

* 3 miles sand-clay.

† 5 miles "natural gravel."

§ Ouachita Parish $\left\{ \begin{array}{l} \text{Average cost } 4\frac{1}{4} \text{ miles gravelled road } \$3,196.58 \\ \text{Average cost 13 miles earth road } \dots\dots\dots 884.90 \end{array} \right.$

† This item includes the cost of 1.1 miles of drainage canal, costing approximately \$3,093.70.

	Miles	Cost	Average Cost per Mile
Total Earth Roads Constructed	99.52	\$ 90,508.85	\$ 909.45
Total Sand-Clay Roads Constructed	50.39	43,797.59	869.17
Total Gravelled Roads Constructed	5.07	18,608.54	3,670.32
Total	154.98	\$152,914.98	

Average cost per mile of all roads constructed

\$986.67

CONTRACTS LET BY THE HIGHWAY DEPARTMENT, BOARD OF STATE ENGINEERS,
FROM APRIL 20, 1912 TO APRIL 20, 1914.

State of Louisiana.

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DATE OF CONTRACT	NAME OF ROAD	PARISH	CHARACTER	DISTANCE IN MILES
1912				
June 7	Colfax—Montgomery	Grant	Earth	38.00
1913				
February 25	Many—Fort Jessup	Sabine	Earth	11.00
*April 4	Many—Negreet	Sabine	Earth	10.00
June 2	Mansfield Highway	Caddo	Gravel	5.80
*August 25	Belmont—Sodus	Sabine	Earth	10.00
September 8	Mansfield—Benson	DeSoto	Earth	12.00
November 10	Tallulah—Lake Providence	Madison	Earth	9.00
November 24	Section of Columbia—Rayville	Caldwell	Earth	4.00
†	Lafayette Highways	Lafayette	Gravel	16.00
December 17	Baton Rouge—Hope Villa	E. Baton Rouge	Gravel	14.00
*	Many—Belmont	Sabine	Earth	11.00
1914				
January 5	Pointe a la Hache—Section No. 2	Plaquemines	Shell	.85
February 2	New Iberia—Lafayette	Iberia	Earth	4.50
February 17	Extension of Mansfield Highway	Caddo	Gravel	2.50
March 16	Section No. 3 of East Carroll Highway	East Carroll	Earth	6.50
April 3	Arkansas Highway	Caddo	Gravel	5.00
*Force Account—State's Road Outfit. †Contract awarded but not signed.				Total 160.15

ROAD CONTRACTS COMPLETED BY THE HIGHWAY DEPARTMENT, BOARD OF STATE ENGINEERS,
FROM APRIL 20, 1912 TO APRIL 20, 1914.

DATE COMPLETED	NAME OF ROAD	PARISH	MILEAGE	CHARACTER
July 15, 1912	Toca Settlement	St. Bernard	3.00	Shell
Nov. 1, 1912	Poileck Branch	Grant	12.87	Earth
Nov. 1, 1912	Colfax—Rochelle	Grant	30.10	Earth
Apr. 21, 1913	Winnboro Highways	Franklin	12.00	Earth
Apr. 23, 1913	East Carroll Highways	East Carroll	38.00	Earth
May 24, 1913	Mansfield—Logansport	DeSoto	20.00	Earth
Sept. 10, 1913	Colfax—Montgomery	Grant	38.00	Earth
Nov. 13, 1913	New Iberia—Jeanerette	Iberia	9.50	Petrolithic
Mch. 2, 1914	Mansfield Highway	Caddo	5.80	Gravel
Apr. 1, 1914	Pointe a la Hache—Section No. 2	Plaquemines	.82	Shell
Apr. 1, 1914	Many—Negreet	Sabine	10.00	Earth
Apr. 1, 1914	Many—Fort Jessup	Sabine	11.00	Earth
			Total 191.09	

CONTRACTS LET BY THE STATE HIGHWAY DEPARTMENT, BOARD OF STATE ENGINEERS
FROM MAY 22nd, 1911 TO APRIL 20th, 1914.

State of Louisiana.

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NAME OF PROJECT	PARISH	MILEAGE	CHARACTER
Colfax—Rochelle	Grant	30.10	Earth
Pollock Branch	Grant	12.87	Earth
Mansfield—Logansport	DeSoto	20.00	Earth
Toca Settlement	St. Bernard	3.00	Shell
East Carroll Parish Highways	East Carroll	38.00	Earth
Colfax—Montgomery	Grant	38.00	Earth
New Iberia—Jeanerette	Iberia	9.50	Petrolithic
Point a la Hache	Plaquemines	33.00	Shell
Winnsboro Highways	Franklin	12.00	Earth
Many—Fort Jessup	Sabine	11.00	Earth
Mansfield Highway	Caddo	5.80	Gravel
Mansfield—Benson	DeSoto	12.00	Earth
Tallulah—Lake Providence	Madison	9.00	Earth
Columbia—Rayville Section	Caldwell	4.00	Earth
Lafayette Parish Highways	Lafayette	16.00	Gravel
Baton Rouge—Hope Villa	E. Baton Rouge	14.00	Gravel
Pointe a la Hache—Section No. 2	Plaquemines	.85	Shell
New Iberia—Lafayette	Iberia	4.50	Earth
Mansfield Highway Extension	Caddo	2.50	Gravel
Section No. 3—East Carroll Parish Highways	East Carroll	6.50	Earth
Arkansas Highway	Caddo	5.00	Gravel
Force Account Work, using Good Roads Outfit belonging to the Highway Department, Board of State Engineers.			
Belmont—Sodus	Sabine	10.00	Earth
Many—Negreet	Sabine	10.00	Earth
Many—Belmont	Sabine	11.00	Earth
		Total 318.62	

STATEMENT SHOWING AMOUNTS DISBURSED THROUGH THE STATE
HIGHWAY DEPARTMENT, BOARD OF STATE ENGINEERS FOR
HIGHWAY CONSTRUCTION, OF STATE AND PARISH FUNDS.

YEAR	STATE	PARISH	TOTAL
1911.....	19,126.95	24,194.56	43,321.51
1912.....	68,887.54	101,098.88	169,986.42
1913.....	68,481.62	156,504.00	224,985.62
1914 (Up to April 6th)	19,602.40	21,468.15	41,070.55
Total.....	176,098.51	303,265.59	479,364.10

In conclusion, the Highway Department wishes to express its high appreciation of the efficient and valuable services rendered by its corps of employees.

Respectfully submitted,

HIGHWAY DEPARTMENT
OF THE
BOARD OF STATE ENGINEERS,
W. E. ATKINSON,
State Highway Engineer.

C. C. SANDOZ, *Secretary.*

DRAINAGE AND RECLAMATION.

The productiveness of the wet lands of Lower Louisiana, when properly drained and reclaimed, continues to attract much attention.

So much so that the Board of State Engineers has found it difficult to keep pace with the demands made upon it for the engineering advice and direction required of it under certain conditions, by law.

In fact, the Board cannot really be said to have met the situation with anything like general satisfaction, because of the constant drain upon its forces and time by other imperative duties, and the absence of immediate means with which to conduct the proper operations.

This has led, in many directions, to the belief that a Drainage and Reclamation Department of the Board of State Engineers, modelled upon the lines of its State Highway Department, has become necessary.

The Board of State Engineers is in receipt of a number of suggestions in regard to this, among which it selects for publication, as embodying in a concise way the views generally had on the subject, the following letter, recently addressed to the Board of State Engineers by one of the most active workers and developers in drainage and reclamation operations in the State, viz:

"In pursuance of the provisions of the present State Drainage Laws, we have had several occasions during the past few months to request that your Honorable Board make the necessary surveys to decide upon the feasibility of certain drainage projects and make an estimate of the cost of such drainage. In each instance, all of your engineering force was so loaded up with pressing work that you were unable to assign a member of your Board to perform the work as requested, but were forced to appoint some outside engineer to make the surveys and prepare the necessary plans and specifications for your approval.

"For the same reason, it is now impossible for any member of your Board to frequently visit the projects as the work of drainage proceeds in order that you may be assured that the work is being performed according to the plans after they have been adopted by your said Board.

"Now, in justice to the purchasers of the bonds issued to pay the drainage cost as well as to all the owners of the lands within the district being drained, we are of the firm opinion that the work should have more supervision by your Board and we urge that you endeavor to have a highly competent man assigned to this work, a man who can make the preliminary investigations, who can pass upon the feasibility and cost of doing the work, and who will have the time and be able to see that the bond holders' money is properly expended, and the land owners fully protected."

The Board of State Engineers hopes that the subject may be given due consideration and that the necessary legislation follow as promptly as practicable.

By the employment of special engineers and forces at the expense of the Drainage Districts calling upon it for the service, the Board of State Engineers, has, however, been able, during the past two years, to tentatively pass upon the practicability and feasibility, and approximately estimate the cost of draining and reclaiming the lands embraced within the boundaries of some thirty-one (31) drainage propositions, but, beyond these approvals and estimates, it has not found it practicable to follow up any details of construction, nor results accomplished.

The drainage propositions to which reference is made, are as shown in the following statement:

NAME OF DISTRICT	DOMICILE	Date of approval of project	ESTIMATED COST
Sixth Ward and Crowley Drainage Dist...	Crowley, La.	July 1-11	\$ 75,000.00*
Sub-D. D. No. 1 of Avoca Drainage Dist...	Franklin, La.	July 3-11	300,000.00†
Bayou Terre aux Boeufs Drainage Dist...	St. Bernard, La.	May 1-11	500,000.00*
Bayou Sale Drainage District.....	Franklin, La.	May 16-11	171,115.00*
Sub-D.D.No.1—St. Charles Municipal D.D.	Paradis, La.	July 12-11	302,000.00†
No.2.....	Paradis, La.	July 12-11	232,000.00†
English Turn Drainage District	Braithwaite, La.	Feb. 23-12	223,000.00‡
Sub-D.D. No.1 of Gueydan Drainage Dist...	Gueydan, La.	Oct. 2-11	172,000.00*
Drainage Dist. No. 2 of Madison Parish	Mounds, La.	March 8-12	211,658.00†
New River Drainage District	Gonzalles, La.	May 30-11	200,000.00*
Belle Chasse Drainage District	New Orleans, La.	Jan. 12-12	50,000.00†
Sub-D.D. "C"—Bayou Terre aux Boeufs D.D	St. Bernard, La.	April 14-12	213,000.00†
Sub-D.D. No.1 of Pontchartrain D. D.....	New Orleans, La.	April 14-12	220,022.00‡
Vinton Drainage District No. 1	Vinton, La.	Aug. 20-12	106,000.00*
Sub-D.D. "D"—Bayou Terre aux Boeufs D.D	St. Bernard, La.	March 3-12	142,050.00†
Sub-D.D. No. 1 of Upper Terrebonne D. D.	Shreiver, La.	July 9-12	142,000.00†
Jefferson-Plaquemines Drainage District	New Orleans, La.	Nov. 4-12	358,500.00†
Sub-D.D. No. 2 of Gueydan Drainage Dist.	Gueydan, La.	Aug. 7-12	66,500.00†
Lacassine Drainage District No. 1	Jennings, La.	Jan. 9-13	35,750.00‡
Jefferson Drainage District No. 3	New Orleans, La.	Dec. 18-12	152,310.00†
Venice Drainage District	Venice, La.	Feb. 26-13	59,500.00‡
Sub-D.D. No. 1 of Lafourche D. D. No. 13...	Lockport, La.	Aug. 21-13	60,000.00‡
Sub-D.D. No. 1 of 4th Jefferson D. Dist. ...	New Orleans, La.	June 5-13	112,000.00†
Buras Drainage District	Buras, La.	March 27-14	65,000.00†
Sub-D.D. No. 1 of Lafourche D. D. No. 12...	New Orleans, La.	Oct. 21-13	15,000.00†
Caernarvon Drainage District	Poydras P. O., La.	Dec. 3-13	217,380.00†
Sub-D.D. No. 4 of Lafourche D. D. No. 12...	New Orleans, La.	Dec. 8-13	158,000.00†
No. 2 " " " " " " " " " " " " " "	New Orleans, La.	Dec. 8-13	20,500.00†
" " " " " " " " " " " " " "	Lockport, La.	Feb. 16-14	61,500.00‡
Kinder Drainage District No. 2	Kinder, La.	Feb. 6-14	85,000.00†
Sub-D.D. No. 2 of 4th Jefferson D. Dist. ...	New Orleans, La.	April 3-14	48,797.10†
TOTAL.....			\$4,775,582.10

*Estimated by Engineer making surveys, etc.

†Estimated by Engineer making surveys, etc. and cited by Board of State Engineers in letter approving.

‡Amount revised by the Board of State Engineers in letter of approval.

NEW BASIN CANAL AND SHELL ROAD.

The Board of Control of the New Basin Canal and Shell Road has, during the past two years, as during similar periods, called upon the Board of State Engineers, on a number of occasions, for engineering advice and duties.

This has involved surveys and calculations for the proposed dredging of the canal from Rampart Street to Claiborne Street Bridge, as well as lines, levels and specifications for bank reetification and extension, timber bulkheads, reinforced concrete curbing and facing, etc., connected with improvements at or near the mouth of the canal at West End.

The principal work in this connection was embraced in two projects, viz:

- No. 1. Creosoted timber bulkhead or retaining wall, in accordance with the plans and specifications of the Board of State Engineers, extending from the City Sea Wall, to a point near the Southern Yacht Club Reservation, about 550 feet in length, paralleling the West Bank of the New Basin Canal, and at about seventy feet distant therefrom. This work amounted in cost to \$10,037.50, and was duly completed and accepted. Other work, along the same lines, to complete a junction with the creosoted pier head opposite, was executed by the Southern Yacht Club.
- No. 2. (a) Constructing an earthen levee, approximately 400 feet in length, extending from the mainland on the East Bank of the New Basin Canal to the foot bridge crossing the canal;
(b) Cutting down and reshaping the present embankment on both banks of the canal, from the foot-bridge to lighthouse property line, on the East side, and from the Southern Yacht Club Pen entrance to the creosoted pier, on the West side, to the following sections: six (6) feet crown width, and side slopes of one and one-half ($1\frac{1}{2}$) horizontal to one (1) vertical.
(c) Driving a toe-wall of wooden interlocking or dovetail sheet piling, three (3) inches thick, to serve also as a water-tight coffer dam for placing the concrete curbing.
(d) Constructing a reinforced concrete revetment on the embankment slopes facing the canal, and on the embankment slope facing the Lake (East side).

A contract for this was, after due advertisement, let by the Board of Control of the New Basin Canal and Shell Road, on July 31, 1913, amounting to \$35,038.50, work to be commenced on or before August 1, 1913, and to be completed on or before October 20, 1913.

In spite of every effort on the part of those in charge to force the Contractor to expedite this work, he has so far failed to complete it, and, at this time, it being tentatively carried on, in an indifferent and unprogressive way, by the Bondsmen of the Contractor, the latter having finally been placed in default.

In other respects, particularly in the maintenance of the highway from Metairie Cemetery to West End, the improvements requiring attention from the Canal Authorities seem to keep pace with reasonable immediate demands.

STAGES OF THE RIVER AND CERTAIN ATTENDANT CONDITIONS.

From the accompanying table, showing the highest water of previous record, as well as the highest stages attained in 1912, 1913 and 1914, up to April 20, 1914, or the date of this report, at stations on the Mississippi River, mostly governing high water conditions affecting Louisiana, it will be seen that in 1912, rather pronounced new records for high water were established at all such stations, except Vicksburg, Mississippi, and Fort Jackson, Louisiana, a number of which, on that length of the river above Red River Landing, Louisiana, being further augmented in 1913, though at that station and at all others below to Fort Jackson, Louisiana, stages were again materially lowered. At Fort Jackson, Louisiana, practically the same stage was recorded as in 1912.

As a consequence of the developments above described, combined, from time to time, with generally inclement weather conditions, here and there, breaches occurred in 1912 and 1913, respectively, in the lines of public levee in Louisiana, as follows:

In 1912, on the Mississippi River, at Salem, East Carroll Parish, on April 12; at Torras, Pointe Coupee Parish, May 1; at Hymelia, St. Charles Parish, right bank, on May 14; On Red

River, at Normands, Avoyelles Parish, right bank, date not known; at Lake Long, same Parish and bank, date not known; on Bayou des Glaizes, at Long Bridge-Moreauville, Avoyelles Parish, on May 8; and on the Atchafalaya River, at Alto, Avoyelles Parish, right bank, on May 19; at Atkins Bayou, St. Landry Parish, on April 10; at McCracken Bayou, Pointe Coupee Parish, on April 6. All of these breaches, except that at Lake Long, near the lower end of the Levee System on Red River, were closed before the high water of 1913.

In 1913, on the Mississippi River, at Lake St. John or Vaucluse Plantation, Concordia Parish, on April 27; on the Atchafalaya River, at Coville's, Pointe Coupee Parish, on April 25. Both of these breaches have been closed.

With reference to the high water of 1914, it is premature at this date, to make any positive statement.

It may, however, be stated that the stages so far reached at stations from which it may be possible to draw conclusions, and such weather conditions as have so far generally prevailed in the Valleys contributing to high waters in the Lower Mississippi River, do not indicate the approach of more than moderate stages of water in Louisiana.

LOCALITY	Highest Water of Previous Record		High Water 1912		High Water 1913		High Water 1914 (to April 20th)	
	Gauge Reading	Year	Gauge Reading	Above or Below Highest Water	Gauge Reading	Above or Below Highest Water	Gauge Reading	Below Highest Water
MISSISSIPPI RIVER —								
Memphis, Tenn.	40.37	1907	45.23	+ 4.86	46.10	+ 0.87	32.90	7.47
Arkansas City, Ark.	52.90	1903	55.33	+ 2.43	55.10	-- 0.23	41.80	11.10
Greenville, Miss.	49.10	1903	50.76	+ 1.66	50.40	-- 0.36	36.10	13.00
Lake Providence, La.	46.48	1903	48.25	+ 1.77	48.00	-- 0.25	36.20	10.28
Vicksburg, Miss.	52.48	1907	51.65	-- 0.83	52.40	-- 0.08	40.40	12.08
St. Joseph, La.	48.07	1903	48.60	+ 0.53	49.50	+ 0.90	36.90	11.17
Natchez, Miss.	50.35	1903	51.42	+ 1.07	52.40	+ 0.98	41.50	8.85
Red River Landing, La.	50.20	1897	53.20	+ 3.00	50.60	-- 2.60	40.60	9.60
Baton Rouge, La.	40.65	1897	43.83	+ 3.18	41.30	-- 2.53	31.20	9.45
Donaldsonville, La.	32.75	1897	35.10	+ 2.35	32.80	-- 2.30	24.20	8.55
Carrollton, La.	19.42	1903	21.05	+ 1.63	19.20	-- 1.85	13.50	5.92
New Orleans, La.	20.30	1903	21.40	+ 1.10	20.30	-- 1.10	15.00	5.30
Fort Jackson, La.	8.30	1907	8.28	-- 0.02	8.30	0.00	6.30	2.00
RED RIVER —								
Fulton, Ark.	35.75	1876	30.62	-- 5.13	23.90	-- 11.85	31.30	4.45
Shreveport, La.	35.70	1892	19.30	-- 16.40	12.40	-- 23.30	23.10	12.60
Alexandria, La.	41.80	1908	33.56	-- 8.24	24.20	-- 17.60	34.60	7.20
ATCHAFALAYA RIVER —								
Barbres Landing, La.	50.95	1897	53.35	+ 2.40	50.20	-- 3.15	39.70	13.65
Melville, La.	39.70	1908	41.90	+ 2.20	41.70	-- 0.20	36.50	3.20

+ Above highest water of previous record.

-- Below highest water of previous record.

APPENDICES.

Tabular statements showing details of the levee work of the past two years, and important statements of high water records will be found in the appendices following this report.

Appendix "A." Tabular statements relative to location, length, character, or class, and cost of levee work undertaken by the State of Louisiana, the several Levee Districts of the State, and the United States in Louisiana, and a part of Arkansas, from April 20, 1912, to April 20, 1914.

Appendix "B." Tabular statements relative to high water records. Also map relative to Highways.

In conclusion, the Board of State Engineers would express its very great appreciation of the efficient and valuable services which have at all times been rendered by its corps of employes, namely: G. W. Lawes, Secretary; A. C. Duval, Chief Draftsman; Walter P. Villere, Assistant Draftsman; D. C. Daniel, Assistant Secretary, Stenographer and Typewriter; J. R. Adams, J. F. Villavaso, F. B. Grevemberg, Jr., and C. B. Huggins, Levelers, and T. A. Mottram, Computer.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,

FRANK M. KERR,

Chief State Engineer.

GERVAIS LOMBARD,

J. W. MONGET,

MARSHALL P. ROBERTSON,

JOHN KLOREK,

Assistant State Engineers.

G. W. LAWES, *Secretary.*

APPENDIX A.

TABULAR STATEMENTS RELATIVE TO LOCATION, LENGTHS, QUANTITY AND COST OF LEVEE WORK, DRAINAGE, REVETMENT, ETC., UNDERTAKEN BY STATE OF LOUISIANA, THE SEVERAL BOARDS OF LEVEE COMMISSIONERS, AND THE UNITED STATES, IN LOUISIANA AND A PART OF ARKANSAS, FROM APRIL 20TH, 1912, TO APRIL 20TH, 1914.

NOTE: The yardage given in the following statements for work done by the levee districts and State is based upon the list of dimensions furnished and estimates made by the Board of State Engineers for the levees named, and the cost is obtained by applying the price per cubic yard bid for the work, without regard to discount, interest or other incidental expenses incurred by the Levee Commissioners, nor does it contain the cost of repair work, high water expense, etc., not usually of record in the office of the Board of State Engineers.

APPENDIX A.

STATEMENT No. 1.

STATE CONTRACTS.

Levee work undertaken by the State of Louisiana in the several Levee Districts under fifty-four contracts entered into from April 20, 1912 to April 20, 1914, with eleven contracts of earlier date not completed April 20, 1912.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
								Price—Cents		
FIFTH LOUISIANA LEVEE DISTRICT.										
1	Donna Vista.....	East Carroll.....	Aug. 4, 1913	Mar. 5, 1914	3,340	9,480	172,781	\$ 51,817.02	29.99	Mississippi Riv.
2	Goodrich.....	East Carroll.....	Sept. 17, 1912	Mar. 20, 1914	.....	12,535	124,757	47,282.90	37.90	Mississippi Riv.
3	Carolina to Willow Glen.....	Madison.....	Sept. 17, 1912	.....	.....	9,765	129,231	32,113.90	24.85	Mississippi Riv.
4	Willow Glen to Delta Section.....	Madison.....	.....	.....	.....	5,714	120,118	29,819.32	24.85	Mississippi Riv.
5	Delta to Martin.....	Madison.....	Aug. 21, 1911	Jan. 9, 1914	.....	7,066	144,270	25,521.36	17.69	Mississippi Riv.
6	Martin.....	Madison.....	Aug. 21, 1911	.....	.....	8,200	67,791	20,303.53	29.99	Mississippi Riv.
7	Hodges.....	Madison.....	Aug. 21, 1911	Aug. 23, 1913	.....	9,320	53,691	12,563.69	23.40	Mississippi Riv.
8	Diamond Island.....	Madison.....	Aug. 21, 1911	.....	.....	14,030	97,885	27,407.80	28.00	Mississippi Riv.
9	Long to Perkins.....	Texas.....	Aug. 4, 1913	.....	.....	4,105	150,086	44,194.44	29.45	Mississippi Riv.
10	Delta Section.....	Texas.....	Aug. 29, 1912	Sept. 8, 1913	578	4,615	60,950	17,949.77	20.45	Mississippi Riv.
11	Ingfield.....	Texas.....	Jan. 3, 1910	July 18, 1912	.....	1,300	42,792	10,441.25	24.40	Mississippi Riv.
12	Kenup & Stockbridge Extn.....	Texas.....	Sept. 4, 1911	Jan. 21, 1911	1,300	6,054	72,611	14,522.20	20.00	Mississippi Riv.
13	Lake St. John Dike.....	Concordia.....	Feb. 26, 1914	.....	.....	686	66,015	20,794.73	31.50	Mississippi Riv.
	Totals.....				5,308	91,454	1,100	2,959.00	26.90	Mississippi Riv.
	Less work done previous to April 20, 1912, and work not completed April 20, 1914.....				556	12,708	131,808	\$357,720.90	.....
	Work done from April 20, 1912 to April 20, 1914.....				4,852 or 14.89 miles.	78,686 miles.	236,036	55,563.33	.....
							1,077,838	\$302,217.57	.....
										{Average price per cubic yard 28.07c.

ATCHAFALAYA BASIN LEVEE DISTRICT.

13 Merrick.....	Pointe Coupee.....	Sept. 18, 1913	1,056	23,678	\$	4,664.56	19.70	Mississippi Riv.	{ 5c per cu. yd. extra paid for overhaul for part. (Average price per cubic yard 19.63c.
14 Smithland.....	Pointe Coupee.....	Aug. 17, 1910	4,308	142,263		25,607.34	18.00	Mississippi Riv.	
Red River Landing Section.....	Pointe Coupee.....	Dec. 22, 1913	1,985	66,875		12,037.50	18.00	Mississippi Riv.	
Torras (Enlgt. Sect.).....	Pointe Coupee.....	.....	.....	30,570		5,502.60	18.00	Mississippi Riv.
Torras (Crevasse Section).....	Pointe Coupee.....	.....	4,844	175,489		31,588.02	18.00	Mississippi Riv.
Ferguson Sect.....	Pointe Coupee.....	.....	2,090	48,999		9,542.17	18.00	Mississippi Riv.
15 Hudson.....	Pointe Coupee.....	Feb. 12, 1912	4,285	135,947		29,908.34	22.00	Atchafalaya Ri.	
Totals.....			18,568	623,821		\$118,850.53	.....	
Less work done previous to April 20, 1912.....			6,721	250,085		45,484.90	.....	
Work done from April 20, 1912 to April 20, 1914.....			11,847 or 1.06 miles.	5,603		73,365.63	.....	

PONTCHARTRAIN LEVEE DISTRICT.

16 St. Joseph Church.....	St. James.....	Sept. 4, 1913	3,010	79,217		18,536.78	23.40	Mississippi Riv.	{ Average price per cubic yard 23.72c.
17 Cornland.....	St. John.....	Oct. 22, 1912	1,085	34,934		8,688.09	24.87	Mississippi Riv.	
18 Anchor.....	St. John.....	Sept. 17, 1912	1,521	72,259		16,980.87	23.50	Mississippi Riv.	
Work done from April 20, 1912 to April 20, 1914.....			5,616 or 1.06 miles.	186,410		\$ 44,205.81	.....	

CONCRETE PAVING OR REVETMENT.

19 Upper Protection Levee to Southport.....	Jefferson.....	Nov. 10, 1913		Sq. Yds.		9,414.98	99.13	Mississippi Riv.
Work done from April 20, 1912 to April 20, 1914.....						9,414.98		

APPENDIX A.

STATEMENT No. 1—Continued.

STATE CONTRACTS.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
20	Parish Line to Belle Chasse.....	Plaquemines..	Aug. 21, 1911	Nov. 18, 1912	15,207	11,485	391,832	81,529.82	20.70	Mississippi Riv. { Includes \$420.60 additional for high water expenses
21	Junior.....	Plaquemines..	Oct. 23, 1913	Jan. 31, 1914	1,015	.....	11,833	2,957.07	24.99	Mississippi Riv. {
	Totals.....				16,222	11,485	403,665	\$ 84,486.89	.....
	Less work done previous to April 20, 1912.....				3,300	9,812	106,784	22,104.29	.....
	Work done from April 20, 1912 to April 20, 1914.....				12,922 or 2.45 miles.	1,643 miles.	296,881	62,382.60		{ Average price per cubic yard 21.02c

LAFOURCHE LEVEE DISTRICT.

LAFOURCHE LEVEE DISTRICT—REVENUE.

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Mississippi Riv.

STATE CONTRACTS.

LAKE BORGNE BASIN LEVEE DISTRICT.

CONCRETE PAVING OR REVETMENT.

WOODEN REVETMENT.

					Lin. Ft.			
Fazendville.....	St. Bernard...	Oct.	4, 1912	Feb. 1, 1913	.....	1740	\$ 2923.20	\$1.08 Mississippi Riv.
					.....		Per	
					.....	1740	\$ 2923.20	foot
Work done from April 20, 1912 to April 20, 1914.....								

STATE CONTRACTS.

STATEMENT No. 1—Continued.

APPENDIX A.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Price—Cents	Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost			
GRAND PRAIRIE LEVEE DISTRICT.											
29	Brophy.....	Plaquemines..	Aug. 4, 1913	Dec. 15, 1913	1,415	.....	10,663	\$ 1,864.92	17.49	Mississippi Riv.	Grand Prairie Levee Dist. and local interests paid additional amount. (Average price per cubic yard 17.79c)
30	Rapp.....	Plaquemines..	Nov. 2, 1912	Mar. 6, 1913	1,829	.....	13,826	2,484.53	17.97	Mississippi Riv.	
	Extension.....	Plaquemines..	.....	.....	7,400	.....	3,925	705.32	17.97	Mississippi Riv.	
Work done from April 20, 1912 to April 20, 1914.....					1,415 or 0.26 miles.	9,229 or 1.74 miles.	28,414	\$ 5,054.77	.....	
WOODEN REVETMENT.											
31	Burton to Louborough.....	Plaquemines..	Oct. 8, 1912	Jan. 13, 1913	.....	.....	Lin. Ft.	\$ 7,580.99	88.47	Mississippi Riv.	
32	Polite Canal to Cullen.....	Plaquemines..	Aug. 5, 1913	Dec. 22, 1913	.....	.....	16,300	13,476.84	82.68	Mississippi Riv.	
Work done from April 20, 1912 to April 20, 1914.....					.....	.....	24,836	\$ 21,057.83	.....	

APPENDIX A.

STATEMENT No. 1—Continued.

STATE CONTRACTS.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
PLAQUEMINES PARISH EAST BANK LEVEE DISTRICT.										
42	Restoration of Gulf Coast.	Plaquemines.	April 29, 1910	Oct. 7, 1912	.....	117,700	224,302	\$ 44,860.40	20.00	Gulf Coast.
43	Cushlich Side.	Plaquemines.	Mar. 30, 1911	Oct. 15, 1912	.....	1,640	7,219	1,552.08	21.50	Gulf Coast.
	Totals.....				.....	1,640	231,521	\$ 46,412.48	.....
	Less work done previous to April 20, 1912.....				.....	103,576	200,000	40,000.00	.....
	Work done from April 20, 1912 to April 20, 1914.....				.....	1,640 or 0.31 miles.	31,521	\$ 6,412.48	.....	(Average price per cubic yard 20.34c

JOINT ORGANIZATION, ATCHAFALAYA BASIN AND LAFOURCHE LEVEE DISTRICTS.

STEEL SHEET PILING

		Ascension.....	April 16, 1913	May 15, 1913		Lin. Ft.		Cost	Mississippi Riv.
44	Donaldsonville Dike.....				.....	326	\$ 10,697.68	10%	
	Totals.....				.....	326	\$ 10,697.68	Com	
	Work done from April 20, 1912 to April 20, 1914.....				.....	326	\$ 10,697.68	.....

LEVEE WORK.

45 Bayou Lafourche Dam.....	Ascension.....	Aug. 13, 1913.....	1,180.....	Cub. Yds. 51,585.....	\$ 12,380.40	24.00	Mississippi Riv.	(Contract includes concrete paving or revetment and sheet piling)
Work done from April 20, 1912 to April 20, 1914.....			1,180 or 0.22 miles.	51,585.....	\$ 12,380.40	.....	.....	Completed, final not issued

CONCRETE PAVING OR REVETMENT.

Bayou Lafourche Dam.....	Ascension.....	Aug. 13, 1913.....		Sq. Yds. 9,964.....	\$ 9,635.08	97.00	Mississippi Riv.
Work done from April 20, 1912 to April 20, 1914.....				9,964.....	\$ 9,635.08	.....	.....

WAKEFIELD SHEET PILING.

Bayou Lafourche Dam.....	Ascension.....	Aug. 13, 1913.....		Lin. Ft. 1,789.....	\$ 16,098.97	Force	Mississippi Riv.
Work done from April 20, 1912 to April 20, 1914.....				1,789.....	\$ 16,098.97	Acct.	.....

BOSSIER LEVEE DISTRICT.

46 Fat Cash.....	Bossier.....	Nov. 11, 1912	Mar. 7, 1913	1,245.....	Cub. Yds. 8,457.....	\$ 1,260.09	14.90	Red River	Completed, final not issued
47 Belcher.....	Bossier.....	Nov. 11, 1912	Jan. 17, 1913	1,565.....	11,916.....	1,668.24	14.00	Red River	
48 Sunflower.....	Bossier.....	Nov. 11, 1912	May 26, 1913	3,220.....	45,633.....	6,744.56	14.78	Red River	
49 Sunflower.....	Bossier.....	Aug. 26, 1913.....		4,110.....	64,710.....	10,677.15	16.50	Red River	
50 Mercer.....	Bossier.....	Nov. 11, 1912	July 19, 1913	4,593.....	65,331.....	9,361.93	14.33	Red River	
Work done from April 20, 1912 to April 20, 1914.....				14,673 or 2.77 miles.	196,047.....	\$ 29,711.97	(Average price per cubic yard 15.16c)

APPENDIX A. STATEMENT No. 1—Continued. STATE CONTRACTS.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost			Price—Cents
BOSSIER SUB-LEVEE DISTRICT.										
51	Carolina.....	Bossier.....	Sept. 4, 1911	July 9, 1912	5,906	2,680	99,292	\$ 12,808.67	12.90	Red River
	Totals.....				5,906	2,680	99,292	12,808.67		
	Less work done previous to April 20, 1912.....				1,983		72,930	6,619.12		
	Work done from April 20, 1912 to April 20, 1914.....				3,923 or 0.74 miles.	2,680 miles.	26,362	\$ 6,189.55		
RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT.										
52	Iron Mountain Crossing to Hynsons.....	Rapides.....	Sept. 4, 1913	April 6, 1914		4,000	22,442	\$ 3,815.14	17.00	Bayou Rapides
53	Cut-Off Bayou.....	Rapides.....	Mar. 28, 1912	Aug. 12, 1912	1,165		21,367	3,194.35	14.95	Red River
54	Wilson Point to Lower Parish Line Ext'n.....	Rapides.....	Nov. 19, 1912	Dec. 10, 1913		11,611	52,157	9,596.81	18.40	Red River
55	Guillon.....	Avoyelles.....	Feb. 18, 1914		2,452		85,623	17,124.60	20.00	Red River
56	Deer Range.....	Avoyelles.....	Aug. 29, 1912	July 1, 1913	3,803		96,970	23,272.80	24.00	Atch. River
57	Akins Bayou to Krotz Springs.....	St. Landry.....	Mar. 20, 1913	Mar. 14, 1914	10,206	31,290	87,559	30,207.85	34.50	Atch. River
58	Latanier South (690-805).....	St. Landry.....	Oct. 3, 1910	Sept. 30, 1912			226,121	49,746.62	22.00	Atch. River
	Totals.....				17,620	46,901	592,239	\$ 136,958.17		
	Less work done previous to April 20, 1912 and remaining April 20, 1914.....				11,836		293,240	62,800.34		
	Work done from April 20, 1912 to April 20, 1914.....				5,784 or 1.09 miles.	46,901 miles.	298,999	\$ 74,157.83		
										{ Average price per cubic yard 24.80c

APPENDIX A. STATEMENT No. 1—Continued. STATE CONTRACTS.

NATCHITOCHES SUB-LEVEE DISTRICT.

Iron Mountain Crossing to Hynson, Alexandria Front Exten. Cut-Off Bayou. Wilson. Dupuy. Wilson Point to Lower Parish Line Extension.	Rapides. Rapides. Rapides. Rapides. Rapides.	Sept. 4, 1913 Mar. 28, 1912 Mar. 28, 1912 Nov. 19, 1912 Extension.	April 6, 1914 Aug. 12, 1912 Aug. 6, 1912 Dec. 19, 1913 .	4,300 2,153 1,743 1,028 12,265 6,819	17,547 40,626 43,205 10,785 44,977 31,653	\$ 2,987.58 6,073.60 7,228.20 1,720.21 8,275.77 5,824.23	17.00 14.95 16.73 15.95 18.40 18.40	Red River Red River Red River Red River Red River Red River
Work done from April 20, 1912 to April 20, 1914			4,924 or 0.93 miles.	23,414 or 4.43 miles.	188,793	\$ 32,109.59	.....	{Average price per cubic yard 17.91c.

RED RIVER AND BAYOU DES GLAIZES LEVEE AND DRAINAGE DISTRICT.

61 Gardiner. 62 Ben Ruth Lake.	Avoyelles. Avoyelles.	Nov. 11, 1912 Sept. 4, 1913	Feb. 8, 1913 Dec. 22, 1913	2,715 1,200	27,484 39,365	4,191.31 8,381.57	15.25 21.80	Red River Red River
Work done from April 20, 1912 to April 20, 1914				3,915 or 0.74 miles.	66,849	\$ 12,772.88	.....	{Average price per cubic yard 19.11c.

SALINE LEVEE AND DRAINAGE DISTRICT.

63 Experiment Plantation, South. 64 Vick P. O., South. 65 School House, South. Extension.	Avoyelles. Avoyelles. Avoyelles. Avoyelles.	Sept. 25, 1912 Dec. 4, 1912 Sept. 12, 1913 Extension.	Jan. 17, 1913 Sept. 25, 1913 .	9,600 4,000 5,800 6,000	65,172 33,364 42,090 44,500	\$ 9,775.80 5,338.24 7,104.79 7,511.60	15.00 16.00 16.88 16.88	Red River Red River Red River Red River
Totals.			845	25,400 5,400	185,126 39,940	\$ 29,730.43 6,741.87	.....
Less work remaining to be done April 20, 1914.			845 or 0.16 miles.	20,000 or 3.79 miles.	145,186	\$ 22,988.56		{Average price per cubic yard 15.83c.
Work done from April 20, 1912 to April 20, 1914								

APPENDIX A

STATEMENT No. 1—Continued.

STATE CONTRACTS.

RECAPITULATION OF WORK DONE FROM APRIL 20, 1912 TO APRIL 20, 1914, AS SHOWN IN THE FOREGOING

LEEVEE WORK.

NAME OF DISTRICT	MILES OF		Cubic Yards	Cost	Total Cost
	New Levee	Enlargement			
Fifth Louisiana.....	0.92	14.89	1,077,838	\$ 302,217.57	
Atchafalaya Basin.....	2.24	1.06	373,736	73,365.63	
Pontchartrain.....	1.06	.....	186,410	44,205.81	
Lafourche.....	2.45	-0.30	296,881	62,382.60	
Lake Borgne Basin.....	0.60	4.05	161,086	39,863.94	
Buras.....	1.05	1.51	70,959	15,981.90	
Grand Prairie.....	0.26	1.74	28,414	5,054.77	
Piacquienes Parish East Bank.....	0.31	2.68	31,521	6,412.48	
Bossier.....	2.77	.....	196,047	29,711.97	
Bossier Sub-District.....	0.74	0.51	26,362	6,180.55	
Red River, Atchafalaya and Bayou Boeuf.....	1.09	8.88	298,999	74,157.83	
Natchitoches Sub-District.....	0.93	4.43	188,793	32,109.59	
Red River and Bayou des Glazes Levee and Drainage.....	0.74	.....	66,849	12,722.88	
Saline Levee and Drainage.....	0.16	3.79	145,186	22,988.56	
Joint Organization.....	0.22	.....	51,585	12,380.40	
Totals.....	15.54	43.84	3,200,646	\$ 739,745.48	\$ 739,745.48

APPENDIX A

STATEMENT No. 1—Continued.

STATE CONTRACTS.

WOODEN REVETMENTS.

	Lin. Feet	\$
Lafourche.....	1,022	947.80
Lake Borgne Basin.....	1,740	2,923.20
Buras.....	10,753	8,660.94
Grand Prairie.....	24,869	21,057.83
Totals.....	38,384	\$ 33,589.77

CONCRETE REVETMENT OR PAVING.

	Sq. Yards	\$
Pontchartrain.....	9,948	9,414.98
Lake Borgne Basin.....	10,317	7,944.07
Totals.....	19,815	\$ 17,358.05

IMPROVING BAYOU LAFOURCHE.

	Concrete Revetment Sq. Yards	Wakefield Sheet Piling Lin. Feet	Steel Sheet Piling Lin. Feet	\$
Joint Organization.....	9,934	1,789	326	10,697.68
Atchafalaya and Lafourche.....		1,789	326	16,098.97
Totals.....		1,789	326	9,635.08
Grand Total.....	9,934	1,789	326	\$ 36,431.73
				\$ 827,125.03

APPENDIX A. STATEMENT No. 2. TENSAS BASIN LEVEE DISTRICT

Levee work undertaken by the Board of Commissioners of the Tensas Basin Levee District, under eight contracts entered into from April 20, 1912 to April 20, 1914, with one contract of earlier date not completed April 20, 1912.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost	Price—Cents	
1	Amos Bayou to O'Possum Fork Section 1, Section 1, Extension	Desha Co. Ark.	Sept. 17, 1912			10,000	101,858	\$ 28,520.24	28.00	Mississippi Riv.
	Section No. 2	Desha Co. Ark.				9,490	56,298	15,763.44	28.00	Mississippi Riv.
	Section No. 3	Desha Co. Ark.				10,240	120,124	30,931.93	25.75	Mississippi Riv.
	Section No. 4	Desha Co. Ark.				10,005	141,444	36,421.83	25.75	Mississippi Riv.
	Section No. 5	Desha Co. Ark.				5,755	120,285	31,875.52	26.50	Mississippi Riv.
	Section No. 6	Desha Co. Ark.				7,635	5,265	1,737.45	33.00	Mississippi Riv.
2	Upper Lucrea Topping	Desha Co. Ark.	April 17, 1914			3,836	42,014	9,441.08	22.00	Mississippi Riv.
3	Lower Lucrea	Desha Co. Ark.	Sept. 4, 1911	Nov. 25, 1913		320	124	74.40	60.00	Mississippi Riv.
4	Chicot Topping	Desha Co. Ark.	Feb. 14, 1914			2,400	617	339.35	55.00	Mississippi Riv.
5	Sappington Topping	Desha Co. Ark.	Feb. 14, 1914	Feb. 26, 1914		660	1,800	990.00	55.00	Mississippi Riv.
6	Middle Bayou Loop	Desha Co. Ark.	Feb. 14, 1914	Feb. 26, 1914		3,000	414,585	55,438.35	11 & 51	Mississippi Riv.
7	Panther Forest	Chicot Co. Ark.	Aug. 1, 1912	April 12, 1913						
8	Gaines Landing	Chicot Co. Ark.	Sept. 4, 1913	Mar. 5, 1914		1,838	39,360	10,528.80	26.75	Mississippi Riv.
9	Brooks Mill North	Chicot Co. Ark.	Aug. 13, 1913			11,060	176,946	52,906.85	29.90	Mississippi Riv.
Totals						73,439	1,221,620	\$ 274,969.24		
Less work remaining April 20, 1914						2,302	46,885	12,424.52		
Work done from April 20, 1912 to April 20, 1914						71,137 or 0.57 miles.	1,174,735	\$ 262,544.72		{Average price per cubic yard 22.35c

U. S. Contract Dist.,
paying extra

APPENDIX A. STATEMENT No. 3—Continued. FIFTH LOUISIANA LEVEE DISTRICT.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost	Price—Cents	
23	Delta Ramp.....	Madison.....	Jan. 23, 1914	.....	.....	420	2,500	621.25	24.85	Mississippi Riv.
24	Reid-Biggs.....	Madison.....	Aug. 28, 1913	.....	.....	18,120	378,626	126,208.27	33.33	Mississippi Riv.
25	Biggs Slide "Repair".....	Madison.....	Nov. 1, 1912	Dec. 5, 1912	.....	115	3,334	1,000.20	30.00	Mississippi Riv.
26	Bedford Spur.....	Madison.....	Aug. 29, 1912	Nov. 14, 1912	331	.....	10,106	2,521.45	24.95	Mississippi Riv.
27	Bayou Roundway.....	Madison.....	Aug. 28, 1913	Apr. 8, 1914	.....	6,150	60,955	16,884.53	27.70	Mississippi Riv.
28	Barn.....	Tensas.....	Aug. 15, 1913	Jan. 21, 1914	.....	925	29,092	7,825.75	26.90	Mississippi Riv.
29	White Oak Lake R. S. Slope.....	Tensas.....	Aug. 15, 1913	Mar. 4, 1914	.....	10,308	142,074	46,742.35	32.90	Mississippi Riv.
30	Panola.....	Tensas.....	Aug. 15, 1913	Dec. 15, 1913	621	.....	21,220	5,708.18	26.90	Mississippi Riv.
31	St. Joseph Repair and Ramp.....	Tensas.....	Dec. 19, 1912	Sept. 10, 1913	.....	375	4,209	1,473.15	35.00	Mississippi Riv.
32	Cottage Home Loop.....	Tensas.....	Dec. 9, 1912	Mar. 31, 1913	1,594	.....	54,048	16,754.88	31.00	Mississippi Riv.
33	Kemp "Repair".....	Tensas.....	Aug. 15, 1913	Dec. 5, 1913	.....	330	15,781	3,866.34	24.50	Mississippi Riv.
34	Aquasco.....	Tensas.....	Aug. 15, 1913	Dec. 5, 1913	.....	700	18,562	4,993.18	26.90	Mississippi Riv.
35	L'Argent.....	Tensas.....	Aug. 15, 1913	Dec. 5, 1913	.....	1,624	21,035	5,658.41	26.90	Mississippi Riv.
36	Hole in the Wall.....	Concordia.....	Aug. 15, 1913	Dec. 5, 1913	.....	1,201	5,094	1,370.29	26.90	Mississippi Riv.
37	Cane Brake Plantation.....	Concordia.....	Aug. 15, 1913	Dec. 5, 1913	.....	290	7,427	1,819.61	24.50	Mississippi Riv.
38	White Hail Road Crossing.....	Concordia.....	Aug. 28, 1912	Oct. 21, 1912	.....	216	740	137.03	19.87	Mississippi Riv.
39	Vauchuse Spur.....	Concordia.....	Dec. 16, 1913	May 26, 1913	969	.....	18,766	4,691.59	25.00	Mississippi Riv.
40	Claremont.....	Concordia.....	Sept. 15, 1910	Mar. 4, 1914	1,036	14,614	154,736	21,198.83	13.70	Mississippi Riv.
Totals.....										
Less work done previous to April 20, 1912 and remaining April 20, 1914.....					15,931	145,882	3,180,865	\$ 708,642.34	.....
Work done from April 20, 1912 to April 20, 1914.....					15,931	44,031	631,626	161,985.20	.....
					15,931	101,851	2,529,239	\$ 546,657.14	.....
					or 3.02	or 19.29				(Average price per cubic yard 21.61c)
					miles.	miles.				

APPENDIX A.

STATEMENT No. 4.

ATCHAFALAYA BASIN LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Atchafalaya Basin Levee District, under thirty-two contracts entered into from April 20, 1912 to April 20, 1914, with three contracts of earlier date not completed April 20, 1912.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.	TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate		Enlargement	Cubic Yards	Cost	Price—Cents
1	Torras Enlargement.	Pointe Coupee	Oct. 4, 1912	Jan. 27, 1913	3,082	.....	32,488	\$ 9,746	46.30.00
2	Lower Torras.	Pointe Coupee	Aug. 6, 1912	Dec. 23, 1913	.....	1,550	46,706	9,345	16.19.97
3	Innis.	Pointe Coupee	Nov. 7, 1912	Oct. 4, 1913	1,265	1,078	42,319	7,985	59.18.87
4	Bella Vista.	Pointe Coupee	Aug. 20, 1912	May 26, 1913	3,434	.....	123,306	24,518	78.19.87
5	Morganza.	Pointe Coupee	Nov. 7, 1912	Feb. 27, 1914	.....	8,960	143,326	51,574	54.34.40
6	Grand.	Pointe Coupee	June 26, 1913	.....	.....	7,152	206,674	53,735	24.26.00
7	Morriso.	Pointe Coupee	Nov. 7, 1912	.....	.....	7,558	182,365	47,414	90.26.00
8	Eddie Ritchie.	Pointe Coupee	Nov. 7, 1912	Nov. 5, 1913	.....	3,124	59,315	15,421	90.26.00
9	Belle Vale.	Pointe Coupee	Nov. 7, 1912	Nov. 5, 1913	.....	19,280	271,121	48,801	78.18.00
10	Oaks.	Pointe Coupee	Nov. 7, 1912	Feb. 9, 1914	3,888	.....	232,402	47,038	16.20.24
11	Plaquemine City	W. Bat. Rouge	Sept. 17, 1912	Dec. 19, 1913	.....	1,612	21,949	7,572	41.34.50
12	Plaquemine City Front.	Iberville.	Nov. 19, 1912	Dec. 19, 1913	.....	1,570	372,252	6,421	60.23.00
13	Extension.	Iberville.	Oct. 22, 1913	.....	.....	13,673	27,920	6,421	60.23.00
14	Rebecca.	Iberville.	Jan. 8, 1913	Nov. 13, 1913	4,000	.....	37,252	85,617	96.23.00
15	Levert.	Iberville.	Jan. 27, 1913	Jan. 16, 1914	1,840	.....	236,861	59,215	25.25.00
16	Germania.	Ascension.	July 26, 1911	Dec. 28, 1912	5,008	6,242	82,978	22,404	06.27.00
17	Ascension—New Hope.	Ascension.	Nov. 7, 1912	Feb. 9, 1914	1,888	.....	240,400	42,058	55.50.00
18	White Hall.	Ascension.	Apr. 26, 1911	April 6, 1914	.....	14,630	261,083	50,389	02.19.30
19	Haygood.	Pointe Coupee	Aug. 22, 1912	Jan. 27, 1913	8,570	2,373	118,110	15,885	79.13.45
20	Legonier Section.	Pointe Coupee	Feb. 20, 1912	Oct. 10, 1913	4,250	.....	63,628	15,238	90.23.95
21	Milan.	Pointe Coupee	Feb. 20, 1912	Oct. 10, 1913	1,098	.....	105,380	18,968	40.18.00
22	Steve Barbes.	Pointe Coupee	Aug. 22, 1912	Feb. 14, 1913	.....	3,288	20,355	3,663	90.18.00
23	Major Barbes.	Pointe Coupee	Jan. 22, 1913	Feb. 14, 1913	.....	5,107	69,642	22,269	90.29.35
24	Lake Bayou.	Pointe Coupee	Aug. 22, 1912	Oct. 25, 1913	3,633	.....	68,585	14,582	11.21.90
25	Garwood Bayou.	Pointe Coupee	Aug. 12, 1913	Mar. 24, 1914	3,670	2,450	110,675	28,410	36.24.35
		Pointe Coupee	Aug. 12, 1913	Mar. 24, 1914	.....	.....	134,540	31,482	36.23.40
		Pointe Coupee	Aug. 12, 1913	Feb. 3, 1914	.....	.....	25,348	7,097	44.28.00
		Pointe Coupee	Aug. 12, 1913	Feb. 3, 1914	.....	485	6,362	1,949	36.28.00

APPENDIX A. STATEMENT No. 4—Continued. ATCHAFALAYA BASIN LEVEE DISTRICT.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
26	Garwood Bayou "Repair"	Pointe Coupee	.....	April 4, 1913	.....	1,115	11,706	3,511.80	30.00	Atch. Riv.
27	Lataouche South,	Pointe Coupee	July 17, 1913	.....	200	16,285	228,648	55,075.46	24.30	Atch. Riv.
28	Red Cross to Holloway,	Pointe Coupee	Feb. 9, 1914	.....	.....	21,150	392,000	94,864.00	24.20	Atch. Riv.
29	Holloway,	Pointe Coupee	Aug. 1, 1913	.....	.....	7,850	119,407	32,120.48	26.90	Atch. Riv.
30	Holloway to Sherman Bayou,	Pointe Coupee	Jan. 18, 1911	May 16, 1913	.....	30,395	176,709	26,488.66	14.99	Atch. Riv.
31	Coville Crevasse,	Pointe Coupee	.....	.....	4,296	.....	287,698	77,678.46	27.00	Atch. Riv.
	Coville to Holloway Section,	Pointe Coupee	.....	.....	.....	5,045	96,980	26,184.60	27.00	Atch. Riv.
	Coville to McCracken Section,	Pointe Coupee	.....	.....	.....	11,888	221,334	59,760.18	27.00	Atch. Riv.
32	McCracken Bayou,	Pointe Coupee	July 24, 1912	Sept. 2, 1913	5,920	10,476	116,759	23,351.80	20.00	Atch. Riv.
33	McCracken Bayou to Perreaux,	Pointe Coupee	July 28, 1913	.....	.....	163,296	163,296	48,580.66	29.75	Atch. Riv.
34	North of Alabama Bayou,	Pointe Coupee	Feb. 5, 1914	.....	.....	1,274	13,510	3,782.80	28.00	Atch. Riv.
35	Port Barre, South,	St. Landry and St. Martin	.....	April 8, 1914	116,000	.....	600,000	\$ 104,700.00	17.45	
Totals,										
	Less work done previous to April 20, 1912 and remaining April 20, 1914,				181,766	214,100	5,773,517	\$1,304,908.71	.....
					119,064	82,771	2,255,207	388,910.46	.....
Work done from April 20, 1912 to April 20, 1914,										
					42,702 or 8.09 miles	131,329 or 24.87 miles	3,518,310	\$ 915,908.25	.....	{ Average price per cubic yard 26.03c

APPENDIX A. STATEMENT No. 5. PONTCHARTRAIN LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Pontchartrain Levee District, under thirteen contracts entered into from April 20, 1912 to April 20, 1914, with one contract of earlier date not completed April 20, 1912.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED			Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost			
								Price—Cents			
1	South Boulevard to Protection.	E. Bat. Rouge	Feb. 29, 1912	Dec. 5, 1912	.....	2,675	38,093	\$ 17,141.85	45.00	Mississippi Riv.	
2	Upper Protection Levee to Arlington.	E. Bat. Rouge	Nov. 20, 1912	Jan. 7, 1914	.....	10,480	52,446	15,269.34	29.00	Mississippi Riv.	
3	Hermitage.....	Iberville	July 28, 1913	Dec. 29, 1913	869	.....	26,567	6,907.42	26.00	Mississippi Riv.	
4	Mount Olive.....	Iberville	July 28, 1913	.....	1,400	9,250	215,280	35,307.56	16.40	Mississippi Riv.	
	Extension.....	Iberville	.....	.....	.....	8,215	105,000	17,220.00	16.40	Mississippi Riv.	
5	Point Clair.....	Iberville	.....	.....	.....	7,830	100,000	16,400.00	16.40	Mississippi Riv.	
6	Gem.....	Ascension	Aug. 1, 1913	Feb. 2, 1914	.....	4,212	70,364	19,659.70	27.94	Mississippi Riv.	
7	Hermitage.....	Ascension	July 28, 1913	Dec. 4, 1913	1,215	.....	43,713	10,491.12	24.00	Mississippi Riv.	
8	Bourbon.....	St. James	Sept. 4, 1913	Mar. 21, 1914	4,497	.....	87,645	22,261.83	25.40	Mississippi Riv.	
9	Remy.....	St. James	Dec. 22, 1913	Mar. 21, 1914	1,926	.....	189,380	30,262.92	15.98	Mississippi Riv.	
10	Hope.....	St. John	July 28, 1913	Mar. 4, 1914	610	15,854	59,826	14,878.73	24.87	Mississippi Riv.	
11	Cornland, Lower.....	St. John	July 1, 1913	Feb. 5, 1914	1,759	.....	22,938	5,630.07	24.87	Mississippi Riv.	
	Upper Section.....	St. John	.....	.....	809	.....	289,121	76,125.56	26.33	Mississippi Riv.	
12	Bonnet Carré.....	St. John	Aug. 31, 1912	Mar. 6, 1914	.....	4,179	166,415	36,611.30	22.00	Mississippi Riv.	
13	Deekbar North, Sections 1 and 2.	Jefferson	Aug. 31, 1912	.....	612	5,045	118,164	25,996.08	20.00	Mississippi Riv.	
	Section 3.....	Jefferson	.....	.....	.....	5,840	112,381	24,723.83	22.00	Mississippi Riv.	
	Section 4.....	Jefferson	.....	.....	.....	1,807	38,597	8,491.34	22.00	Mississippi Riv.	
	Section 5.....	Jefferson	.....	.....	.....	918	69,093	16,340.49	23.65	Mississippi Riv.	
14	Protection Levee to Southport.	Jefferson	Sept. 4, 1913	Feb. 16, 1914	1,157	.....	.....	.....	.....	.....
	Totals.....	.....	.....	.....	14,851	75,805	2,021,075	\$ 464,020.88	.....	.....
	Less work remaining to be done April 20, 1914.	.....	.....	.....	12,775	171,597	28,886.54	.....	.....	.....
	Work done from April 20, 1912 to April 20, 1914	.....	.....	.....	14,851 or 2.81 miles	63,030 or 11.93 miles	1,849,478	\$ 435,134.34	.....	.....	(Average price per cubic yard 23.53c

APPENDIX A.

STATEMENT No. 5—Continued. PONTCHARTRAIN LEVEE DISTRICT.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Price—Cents	Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost			
WOODEN REVETMENT.											
1	Sarpy.....	St. Charles...	Oct. 28, 1913	Feb. 3, 1914	.....	.....	Lin. Ft. 4,582	\$ 6,286.10	Lin. Foot \$1.39 and 1.25	Mississippi Riv.	
2	Deckbar North.....	Jefferson.....	Dec. 12, 1912	Oct. 2, 1913	.....	.....	2,091	4,098.14	1.96	Mississippi Riv.	
	Work done from April 20, 1912 to April 20, 1914.....				.....	.....	6,673	\$ 10,384.24			

APPENDIX A.

STATEMENT No. 6.

LAFOURCHE LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Lafourche Levee District, under thirteen contracts entered into from April 20, 1912 to April 20, 1914.

	St. John.	Oct. 9, 1912	Dec. 17, 1912	950	9,087	\$	1,908.27	21.00	Mississippi Riv.
1 Stevenson.	Jefferson.	Sept. 25, 1912	Oct. 9, 1912	1,444	57,527		14,957.02	26.00	Mississippi Riv.
2 Fairfield.	Jefferson.	District doing the work	Dec. 17, 1912	13,348	154,995		14,142.98	91%	Mississippi Riv.
3 Nine Mile Pt. to Westwego.	Jefferson.	May 13, 1913	Dec. 21, 1912	7,956	3,669		2,017.95	55.00	Mississippi Riv.
4 Westwego Capping	Jefferson.	May 13, 1913	Oct. 9, 1912	5,460	138,214		33,516.89	24.25	Mississippi Riv.
5 Southside to Company Canal.	Jefferson.	Jan. 17, 1913	Dec. 21, 1912	1,382	13,854		3,186.42	23.00	Mississippi Riv.
6 Four Oaks.	Jefferson.	Jan. 17, 1913	Sept. 25, 1912	1,440	102,970		30,118.72	29.25	Mississippi Riv.
7 Southside.	Jefferson.	Aug. 23, 1912	Oct. 9, 1912	2,286	3,644		1,801.68	22.00	Mississippi Riv.
8 Happy Point.	Jefferson.	Jan. 23, 1913	Dec. 21, 1912	2,635	4,145		1,036.25	23.00	Mississippi Riv.
9 Star.	Plaquemines	Jan. 5, 1914	Oct. 9, 1912	2,115	1,237		284.51	23.00	Mississippi Riv.
10 Diamond.	Plaquemines	Oct. 28, 1912	Feb. 5, 1913	1,100	6,203		1,048.56	24.42	Mississippi Riv.
11 Magnolia "Repair"	Plaquemines	Feb. 5, 1913	Sept. 25, 1912	863	10,821		3,246.30	30.00	Mississippi Riv.
12 Magnolia Cave, "New Levee"	Plaquemines	Jan. 6, 1913	Sept. 25, 1912	2,182	14,220		2,915.10	20.50	Mississippi Riv.
13 Magnolia.	Plaquemines	Jan. 6, 1913	Sept. 25, 1912	2,182	14,220		2,915.10	20.50	Mississippi Riv.
Totals				5,978	520,586	\$	109,780.65		
Less work remaining April 20, 1914.				1,638	40,814	\$	9,897.39		
Work done from April 20, 1912 to April 20, 1914.				5,978 or 1.13 miles.	479,772	\$	99,883.26		
									(Average price per cubic yard 20.82c)

CONCRETE WORK

	Ascension.	Dec. 23, 1912	Mar. 31, 1913	Sq. yards	Per Sq. Yd.
Donaldsonville.	Ascension.	Dec. 23, 1912	Mar. 31, 1913	1,686	\$ 1,270.87
Work done from April 20, 1912 to April 20, 1914.				1,686	\$ 1,270.87
					Mississippi Riv.

APPENDIX A. STATEMENT No. 6—Continued. LAFOURCHE LEVEE DISTRICT.

Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
		Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
TIMBER WORK									
						Lin. Ft.	Per Foot Lin. Cost Plus 25% Com. and Bon's		
Glendale Sheet Piling.....	St. John.....	Jan. 24, 1914.....				6,036	\$ 13,973.34	Mississippi Riv.	
Hymelia Timber Dam.....	St. Charles.....	July 11, 1912	Aug. 19, 1912			1,100	44,621.10	Mississippi Riv.	
Totals.....						7,136	\$ 58,594.44		
Less work remaining April 20, 1914.....						3,836	8,880.34		
Work done from April 20, 1912 to April 20, 1914.....						3,300	\$ 49,714.10		

APPENDIX A.

STATEMENT No. 7. LAKE BORGNE BASIN LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Lake Borgne Basin Levee District, under four contracts entered into from April 20 1912 to April 20, 1914.

	St. Bernard...	Oct.	4, 1912	Nov. 8, 1912	.....	421	3,596	\$	2,337.40	65.00	Mississippi Riv.
1 Slaughter House.....	Fanny.....	Oct.	4, 1912	Jan. 17, 1913	.....	3,630	26,788		4,808.44	17.95	Mississippi Riv.
2 Fanny.....	Plaquemines..	Oct.	4, 1912	Mar. 10, 1914	.....	2,207	50,514		17,619.28	34.88	Mississippi Riv.
3 Belair.....	Plaquemines..	Oct.	4, 1912	Jan. 27, 1913	.....	1,240	16,903		2,852.51	17.00	Mississippi Riv.
4 Livaudais.....	Plaquemines..	Oct.	4, 1912	Jan. 27, 1913	.....	3,447 or 0.65 miles.	4,051 or 0.76 miles.	\$	27,617.63		
Work done from April 20, 1912 to April 20, 1914.....											
Average price per cubic yard 28.32c											

TIMBER WORK.

	St. Bernard...	Oct.	4, 1912	Feb. 6, 1913	.....	Feet B. M.	Per 1000 Feet B. M.
Parish Line to Slaughter House.....	St. Bernard...	Oct.	4, 1912	Feb. 6, 1913	.....	384,240	\$ 17,913.48
							64.50
							Mississippi Riv.

APPENDIX A.

STATEMENT No. 8.

BURAS LEVEE DISTRICT.

Two contracts entered into by the Board of Commissioners of the Buras Levee District from April 20, 1912 to April 20, 1914.

WOODEN REVETMENT.

	Plaquemines..	Nov. 16, 1912	.....	Lin. Ft.	Lin. Ft.	\$	420.36	93.00	Mississippi Riv.
1 Bulot.....	Plaquemines..	Nov. 16, 1912	.....	.....	452		429.71	97.00	Mississippi Riv.
2 Taylor.....	Plaquemines..	Nov. 16, 1912	.....	.....	443				Mississippi Riv.
Work done from April 20, 1912 to April 20, 1914.....							895	\$ 850.07	

APPENDIX A.

STATEMENT No. 9.

CADDO LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Caddo Levee District under sixteen contracts entered into from April 20, 1912 to April 20, 1914, with two contracts of earlier date not completed April 20, 1912.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
1	Blanton Bluff to Peru—Section 1.	Caddo	April 24, 1912	Sept. 2, 1913	2,435	14,490	132,682	\$ 23,882.76	18.00	Red River.
2	Blanton Bluff to Peru—Section 2.	Caddo	April 24, 1912	Feb. 25, 1913	.....	12,575	89,427	16,096.86	18.00	Red River.
3	Blanton Bluff to Peru—Section 3.	Caddo	April 24, 1912	Oct. 11, 1913	.....	6,375	182,202	32,796.36	18.00	Red River.
4	Blanton Bluff to Peru—Section 4.	Caddo	April 24, 1912	Oct. 11, 1913	.....	2,270	151,964	27,353.52	18.00	Red River.
5	Blanton Bluff to Peru—Section 5.	Caddo	April 24, 1912	July 5, 1913	.....	2,497	109,545	19,718.10	18.00	Red River.
6	Blanton Bluff to Peru—Section 6.	Caddo	April 24, 1912	May 15, 1913	.....	.....	12,100	21,737.52	18.00	Red River.
7	Blanton Bluff to Peru—Section 7.	Caddo	April 24, 1912	Feb. 25, 1913	.....	650	124,237	22,362.66	18.00	Red River.
8	Blanton Bluff to Peru—Section 8.	Caddo	April 24, 1912	Feb. 25, 1913	.....	3,570	118,446	21,320.28	18.00	Red River.
9	Rock Point Section.	Caddo	Jan. 7, 1914	.....	2,630	.....	.....	3,182.81	13.60	Red River.
10	Correr Place.	Caddo	Jan. 7, 1914	.....	3,955	.....	55,747	7,581.59	13.60	Red River.
11	Gold Point.	Caddo	Aug. 13, 1913	.....	1,340	.....	11,354	1,555.50	13.70	Red River.
12	Cuba Place.	Caddo	Sept. 19, 1912	Dec. 7, 1912	800	.....	6,824	1,091.84	16.00	Red River.
13	Cuba to Mulhaupt—Section 1.	Caddo	Dec. 16, 1911	July 11, 1913	8,200	.....	73,317	8,211.50	11.20	Red River.
14	Cuba to Mulhaupt—Section 2.	Caddo	Dec. 16, 1911	Mar. 10, 1913	9,158	.....	85,425	9,738.45	11.40	Red River.
15	Twelve Mile Bayou to Cross Bayou.	Caddo	Feb. 14, 1912	Jan. 24, 1913	22,835	.....	193,180	30,754.25	15.92	Red River.
16	Gayle.	Caddo	Aug. 13, 1913	Dec. 27, 1913	.....	3,310	13,842	2,657.66	19.20	Red River.
17	Brown Place.	Caddo	Jan. 11, 1913	.....	5,510	.....	97,506	13,845.85	14.20	Red River.
18	Campo Bello.	Caddo	Dec. 19, 1912	April 21, 1913	1,960	.....	14,904	2,175.98	14.00	Red River.
Totals.					67,810	74,429	1,604,769	\$ 266,063.49		
Less work previous to April 20, 1912 and remaining April 20, 1914.					8,156	.....	100,386	11,457.66		
Work done from April 20, 1912 to April 20, 1914.					59,674	74,420	1,504,413	\$ 254,605.83		(Average price per cubic yard 16.92c)
					or 11.29 miles.	or 14.08 miles.				

Comp. final not issued

See Extn. under Drainage

APPENDIX A.

STATEMENT No. 9—Continued.

CADDO LEVEE DISTRICT

IMPROVING DRAINAGE

1 Kelly Bayou Drainage Canal.....	Caddo.....	April 2, 1913.....	58,800.....	305,000.....	\$ 44,987.50	14.75	{ Held up by U. S. Gov- ernment, pending settle- ment of injunction suit. { Includes cost of clearing { \$1,725.00
2 Big Willow Pass to Albany Falls.....	Caddo.....	Dec. 18, 1912.....	22,440.....	300,000.....	41,250.00	13.75	
3 Brown Place Extension.....	Caddo.....	Jan. 11, 1913.....	9,000.....	20,000.....	2,840.00	14.20	
4 Bennett's Pass.....	Caddo.....	Oct. 22, 1913.....	2,865.....	45,000.....	10,980.00	24.40	
Totals.....			92,905.....	670,000.....	\$ 100,057.50		{ Average price per cubic yard 14.74c
Less work remaining to be done April 20, 1914.....			87,045.....	636,400.....	93,102.50		
Work done from April 20, 1912 to April 20, 1914.....			5,860 or 1.11 miles.....	33,600.....	\$ 4,955.00		

BANK PROTECTION WORK.

In addition to the foregoing levee and drainage work, the Caddo Levee District has undertaken Bank Protection work on Red River, estimated to cost about \$1,000,000.00. The expenditures to date for account of this work amount, in round figures, to \$78,300.00.

APPENDIX A.

STATEMENT No. 10

RED RIVER, ATCHAFALAYA AND

BAYOU BOEUF LEVEE DISTRICT.

Levee work undertaken by the Board of Commissioners of the Red River, Atchafalaya and Bayou Boeuf Levee District, under eight contracts entered into from April 20, 1912 to April 20, 1914, and two contracts not completed April 20, 1912.

1 Long Bridge to Coco Point.....	Avoyelles.....	Aug. 7, 1912.....	31,800.....	162,811.....	\$ 19,504.76	11.98	B. des Glaizes	Comp. final not issued.
2 Sarto Emergency Loop.....	Avoyelles.....	July 11, 1913.....	567.....	6,566.....	1,641.50	25.00	B. des Glaizes	
3 Spurlock to Mill Bayou.....	Avoyelles.....	Nov. 20, 1912.....	4,725.....	240,857.....	40,911.69	17.00	B. des Glaizes	
4 Hamburg.....	Avoyelles.....	Nov. 20, 1912.....	1,415.....	11,818.....	1,654.32	14.00	B. des Glaizes	
5 Simmsport to Atkins Bayou.....	& St. Landry.....	July 23, 1913.....	81,700.....	850,000.....	191,250.96	22.50	Atch. River	

APPENDIX A. STATEMENT No. 10—Continued. RED RIVER, ATCHAFALAYA AND BAYOU BOEUF LEVEE DISTRICT.

Number	Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
			Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
6	St. Joseph Church.....	St. Landry.....	Sept. 16, 1912	Nov. 18, 1912	629	.....	12,480	3,120.00	25.00	Atch. River
7	Elba.....	St. Landry.....	Sept. 20, 1911	Oct. 2, 1912	963	.....	13,861	2,481.12	17.90	Atch. River
8	Elba to Melville—Section 1.....	St. Landry.....	Sept. 4, 1912	Nov. 29, 1913	623	11,595	95,266	18,100.54	19.00	Atch. River
9	Elba to Melville—Section 2.....	St. Landry.....	Sept. 4, 1912	Oct. 24, 1913	3,559	.....	85,239	16,195.41	19.00	Atch. River
10	Elba to Melville—Section 3.....	St. Landry.....	Sept. 4, 1912	Sept. 19, 1913	3,262	2,731	105,110	19,970.90	19.00	Atch. River
11	Elba to Melville—Section 4.....	St. Landry.....	Sept. 4, 1912	Sept. 19, 1913	3,624	2,682	110,617	21,017.23	19.00	Atch. River
12	Atkins Bayou.....	St. Landry.....	July 18, 1912	Jan. 27, 1913	5,940	.....	151,161	33,255.42	22.00	Atch. River
13	Lafayette South.....	St. Landry.....	Sept. 8, 1911	Sept. 23, 1912	1,100	.....	24,049	5,280.78	22.00	Atch. River
Totals.....					57,607	152,643	1,869,635	\$ 374,393.87	{Average price per cubic yard 19.08c	
Less work done previous to April 20, 1912 and not completed April 20, 1914.....					1,575	47,826	527,800	118,368.20		
Work done from April 20, 1912 to April 20, 1914.....					56,032 or 10.61 miles	104,817 or 19.85 miles	1,341,835	\$ 256,025.67		

TIMBER WORK.

Name of Contract	Parish	DATE OF		LINEAR FT.		TOTALS INVOLVED		Stream	Remarks
		Contract	Final Certificate	New Levee	Enlargement	Cubic Yards	Cost		
Spur Dikes.....	St. Landry.....	Sept. 4, 1913	Jan. 16, 1914	.....	.....	.....	\$ 8,999.31	Atch. River	
Work done from April 20, 1912 to April 20, 1914.....				.....	.....	.....	\$ 8,999.31		

APPENDIX A.

STATEMENT No. 11.

ORLEANS LEVEE DISTRICT.

The Board of State Engineers is indebted to the Orleans Levee Board for the following Statement of Work undertaken by the Board of Levee Commissioners under twenty-six contracts entered into from April 1, 1912 to April 1, 1914 with four contracts of earlier date not completed April 1, 1912.

Number	Name of Contract	DATE OF		LINEAR FT.		Cubic Yards		Price—Cents per Cubic Yard	Cost of Earthwork	REVETMENT			Cost	Allowed on Force Acct. Claims, Etc.	Total Cost	Remarks
		Contract	Final Contract	New Levee	Enlargement					Linear Feet	Feet B. M.	Price Per M. Feet B. M.				
1	Andry St. to St. Bernard Parish Line, Enlargement.	Aug. 19, 1912	Dec. 21, 1912	.....	3,306	10,000.00	72.4	\$	7,240.00	.....	.....	.....	.....	\$3,160.00	\$ 10,400.00	
2	Stanton to Beka, New Levee.	Oct. 10, 1912	Sept. 22, 1913	7,174	5,895	253,565.20	20.33		51,549.81	.....	.....	.....	.....	.....	51,549.81	
3	Andry St. to St. Bernard Parish Line, New Levee.	Nov. 11, 1912	Mar. 26, 1913	3,555.3	.....	80,808.61	49.00		39,596.22	.....	.....	.....	.....	.....	39,596.22	
4	Orleans Canal (East Bank) New Levee and Timber Dam across Harrison Ave. Canal.	Nov. 18, 1912	April 18, 1913	9,677.0	.....	25,492.20	24.75		6,309.32	Cost of Timber Dam	.....	.....	\$1,095.00	.....	7,404.32	
5	May St. Lake Shore, New Levee.	Nov. 18, 1912	Nov. 5, 1913	3,883.0	.....	26,419.70	39.25		10,369.73	.....	.....	.....	.....	338.90	10,708.63	
6	Demolition and removal of all Brick Buildings, side and other walks, sewers, etc.	Nov. 23, 1912	Dec. 21, 1912	\$3,235.00	Price bid for all work according to specifications and \$20.00 bonus.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,255.00
7	Stanton to Beka Revetment.	Jan. 4, 1913	Mar. 19, 1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,810.50
8	St. Maurice Ave. to St. Bernard Parish Line Revetment.	Jan. 4, 1913	Feb. 25, 1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,487.52
9	Kentucky St. to Andry St., New Levee.	July 28, 1913	Nov. 21, 1913	4,006.0	.....	142,251.60	26.20		37,269.92	.....	.....	.....	.....	3,150.00	40,419.92	

APPENDIX A. STATEMENT No. 11—Continued. ORLEANS LEVEE DISTRICT.

Number	Name of Contract	DATE OF		LINEAR FT.		Cubic Yards	Price Cents per Cu. Yd.	Cost of Earth Work	REVETMENT			Cost	Allowed on Force Acct. Claims, Etc.	Total Cost	Remarks
		Contract	Final Certificate	New Levee	Enlargement of Levee				Linear Feet	Feet, B. M.	Price Per M. Feet B. M.				
10	Removal of Oil Tank on Stanton Plantation.	Sept. 13, 1913	Oct. 11, 1913	\$400.00	Price bid for all work according to specifications.	45,769.80	24.30	11,122.06	ons.	.....	.....	.....	1,663.00	400.00	
11	Aurion Enlargement.	Oct. 3, 1913	Feb. 6, 1914	.....	5,815	51,589.00	27.30	14,083.80	Less	\$240.00 D	.....	.....	.....	12,785.06	
12	Cut-Off Road Enlargement.	Oct. 3, 1913	Feb. 6, 1914	.....	4,052	157,305.00	23.50	36,966.67	Still under contract.	Paid on account.	.....	.....	.....	13,843.80	(Reserved)
13	Courtes-Orleans, New Levee.	Oct. 3, 1913	Dec. 24, 1913	.....	.....	46,578.50	23.50	10,945.95	.....	.....	.....	.....	162.50	36,966.67	7,393.44
14	Stanton, New Levee.	Oct. 3, 1913	Dec. 24, 1913	1,501	2,130	31,237.30	27.30	8,527.78	.....	.....	.....	.....	.....	11,108.45	
15	Stanton Enlargement.	Oct. 3, 1913	Mar. 20, 1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,527.78	
16	Huguet Pile Bank Protection.	Oct. 3, 1913	This contract was completed as the shore and levee caved in for four hours after the signing of the contract.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	470.00	
17	Removal of eight Cabins on Stanton and Courtes Plantations.	Oct. 10, 1913	Dec. 24, 1913	Price bid for all work, moving and placing eight cabins @ \$175.00 each.	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,400.00	
18	Huguet New Levee.	Oct. 20, 1913	Feb. 6, 1914	1,028.5	.....	32,494.70	29.40	9,553.44	Less \$50.00 Demurrage	.....	.....	.....	.....	9,503.44	
19	Moving Kahle House, Huguet.	Oct. 31, 1913	Nov. 12, 1913	\$250.00	Price bid for all work according to the specifications.	.....	.....	.....	.....	.....	.....	.....	.....	250.00	
20	Construction Pile Revetment Third Dist. Ferry (Aligators).	Nov. 7, 1913	Dec. 24, 1913	75 lin. ft.	Cost Pile Driver and Crew	\$330.30	Day Labor	\$157.72	Materials	\$566.00	.....	.....	.....	1,054.02	
21	London Ave. Canal (West Bank), New Levee and Crescoted Timber Dam.	Dec. 6, 1913	.....	Contract with the Sewerage and Water Board.	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,800.00	(Paid on Account)
22	Building of Earthen Road, Huguet, Orleans, Courtes, Upper and Lower Stanton Levees.	Oct. 21, 1913	Mar. 11, 1914	7,000 lin. ft. @ 10c.	\$700.00 and 2,370 lin. ft. @ 15c.	.....	.....	.....	.....	.....	.....	.....	.....	1,155.50	
23	Pile Revetment in front of the Johnson Iron Works (Aligators).	Jan. 12, 1914	Feb. 7, 1914	84 lin. ft. Labor @ \$6.00 per lin. ft.	\$501.00 and 1,963.2 @ \$1.13 per r ft.	.....	.....	.....	.....	.....	.....	.....	23.59	1,158.67	
24	Cut-Off Road Revetment.	Jan. 20, 1914	Mar. 4, 1914	.....	.....	955.7 @ \$1.10 per r ft.	.....	.....	.....	.....	.....	.....	.....	2,218.42	
25	Stanton Revetment.	Jan. 20, 1914	Mar. 4, 1914	.....	.....	570.4 @ \$1.10 per r ft.	.....	.....	.....	.....	.....	.....	.....	1,137.28	
26	Deneiro Revetment.	Jan. 20, 1914	Mar. 4, 1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	678.78	
Totals.		.....	.....	30,824.8	21,198	903,511.61	.....	\$243,534.70	11,573.3	.....	.....	\$11,332.50	\$8,597.99	\$278,089.79	

ORLEANS LEVEE DISTRICT.

The following contracts reported not complete in the last biennial report, have since been completed:

1	East Bank New Basin Canal Carrollton Ave. to Metairie Ridge.....	Feb. 8, 1911	April 4, 1913	3,400.....	3,323.40	17.00	\$ 564.98	.....	\$ 564.98
2	Montegut St. to Louisa St.....	Aug. 30, 1911	May 13, 1912	1,255.....	60,373.90	57.60	34,775.37	.....	36,344.86
3	Pile Bulkhead Egania St. to Alabo St.....	Oct. 3, 1911	Aug. 2, 1912	1,960 lin. ft. Cre	osoted Pile	Revet	ment @ \$8.	80 per lin ft.....	17,248.00
4	Pile Bulkhead St. Maurice Ave. to St. Bernard Parish Line.....	Feb. 27, 1912	Nov. 15, 1912	1,469 lin. ft. Cre	osoted Pile	Revet	ment @ \$8.	19 per lin ft., and	12,289.16
	Totals.....			4,655 0.88 miles.	63,697.30	.....	\$35,340.35	.....	\$66,447.00

DISTRICT CONTRACTS.

Recapitulation of work done from April 20, 1912 to April 20, 1914 as shown in the foregoing.

Name of District.	Miles of		Cubic Yards	Cost \$	Total Cost
	New Levee	Enlargement			
Tensas Basin.....	0.57	13.47	Levee Work 1,174,735	262,544.72	
Fifth Louisiana.....	3.02	19.39	2,529,239	546,657.12	
Atchafalaya Basin.....	8.90	24.37	3,518,310	915,998.25	
Pontchartrain.....	2.81	11.53	1,849,478	435,134.34	
Lafourche.....	1.13	6.73	479,172	99,883.26	
Orleans.....	5.84	4.01	911,907	271,707.11	
Lake Borgne Basin.....	0.55	0.76	97,501	27,617.63	
Caddo.....	12.29	14.08	1,504,413	254,605.83	
Red River, Atchafalaya and Bayou Boeuf.....	10.61	19.85	1,341,835	256,025.67	
Totals.....	44.01	114.99	13,407,190	\$3,070,173.95	\$3,070,173.95

APPENDIX A. STATEMENT No. 12—Continued. DISTRICT CONTRACTS.
DRAINAGE WORK.

Name of District.	Length, Miles	Cubic Yards	Cost	Total Cost
Caddo.....	1.11	33,000	\$ 4,955.00	\$ 4,955.00
WOODEN REVETMENT.				
		Lin. Feet		
Ponchartrain.....		6,673	\$ 10,384.24	
Orleans.....		11,573	11,332.50	
Buras.....		895	850.07	
Totals.....		19,141	\$ 22,566.81	\$ 22,566.81
TIMBER BULKHEADS AND OTHER TIMBER WORK.				
		Feet B.M.	Linear Feet	
Lafourche.....			3,300	\$ 49,714.10
Orleans.....			1,688	18,230.87
Lake Borgne Basin.....			920	17,913.48
Red River, Atchafalaya and Bayou Boeuf.....			195,744	8,999.31
Totals.....			5,749	\$ 94,857.76
CONCRETE PAVING OR REVETMENT.				
Lafourche.....		Sq. Yds.		
		1,686	\$ 1,270.87	\$ 1,270.87
BANK PROTECTION.				
Caddo.....			\$ 78,300.00	\$ 78,300.00
Grand Total.....				\$3,272,124.39

APPENDIX A.

STATEMENT No. 13.

Tabulated Statement showing number of cubic yards and cost involved in twenty-three contracts (District and State—the

Orleans District not included)—entered into previous to April 20, 1912, and not completed, with 187 contracts en-

tered into between April 20, 1912 and April 20, 1914, divided into accounts showing work done under all;

that is previous to April 20, 1912, between April 20, 1912 and April 20, 1914, and still re-

remaining to be done under existing contracts April 20, 1914.

NAME OF DISTRICT.	Work Done Previous to April 20, 1912		Work Done from April 20, 1912 to April 20, 1914		Work Remaining to be done Under Existing Contracts		Total Amounts Involved in Contracts	
	Cubic Yards	Cost	Cubic Yards	Cost	Cubic Yards	Cost	Cubic Yards	Cost
			BY THE	DISTRICTS				
Tensas Basin.....	.....	.....	1,174,735	\$ 262,544.72	46,885	\$ 12,424.52	1,221,620	\$ 274,969.24
Fifth Louisiana.....	348,200	\$ 60,843.20	2,529,239	546,657.14	303,426	101,142.00	3,180,865	708,642.34
Achafalaya Basin.....	329,300	48,956.95	3,518,310	915,998.25	1,925,907	339,953.51	5,373,517	1,304,908.71
Pontchartrain.....	.....	.....	1,849,478	435,134.34	171,597	28,886.54	2,021,075	464,020.88
Lafourche.....	.....	.....	479,772	99,883.26	40,814	9,897.39	520,586	109,780.65
Lake Borgne Basin.....	.....	.....	97,501	27,617.63	.....	.....	97,501	27,617.63
Caddo.....	34,300	3,872.00	1,504,413	254,605.83	66,056	7,585.66	1,604,769	266,063.49
Red River, Achafalaya and Bayou Boeuf.....	29,800	6,318.20	1,341,835	256,025.67	498,000	112,050.00	1,869,635	374,393.87
Totals.....	741,600	\$119,990.35	12,495,283	\$2,798,466.84	3,052,685	\$611,939.62	16,289,568	\$3,530,396.81

STATEMENT No. 13—Continued.

APPENDIX A.

NAME OF DISTRICT.	Work Done Previous to April 20, 1912		Work Done from April 20, 1912 to April 20, 1914		Work Remaining to be done Under Existing Contracts		Total Amounts Involved in Contracts	
	Cubic Yards	Cost	Cubic Yards	Cost	Cubic Yards	Cost	Cubic Yards	Cost
Fifth Louisiana.....	183,520	\$ 35,321.53	1,077,838	\$302,217.57	72,510	\$ 20,131.80	1,313,863	\$357,720.90
Atchafalaya Basin.....	250,085	45,484.90	373,736	73,365.63	.....	.....	623,821	118,850.53
Pontchartrain.....	.....	.....	186,410	44,205.81	.....	.....	186,410	44,205.81
Lafourche.....	106,784	22,104.29	299,881	62,382.60	.....	.....	403,665	84,486.89
Lake Borgne Basin.....	30,042	5,617.85	161,066	39,863.94	.....	.....	191,108	45,481.79
Grand Prairie.....	.....	.....	28,414	5,064.77	.....	.....	28,414	5,064.77
Buras.....	.....	.....	70,959	15,981.90	.....	.....	70,959	15,981.90
Plaquemines Parish East Bank.....	200,000	40,000.00	31,521	6,412.48	.....	.....	231,521	46,412.48
Possier.....	.....	.....	196,047	29,711.97	.....	.....	196,047	29,711.97
Bossier Sub-District.....	72,930	5,619.12	28,362	6,189.55	.....	.....	99,292	12,808.67
Red River, Atchafalaya and Bayou Boeuf.....	207,617	45,675.74	298,990	74,157.83	85,623	17,134.60	592,239	136,958.17
Natchitoches Sub-District.....	.....	.....	188,793	32,109.59	.....	.....	188,793	32,109.59
Red River and Bayou des Glaises.....	.....	.....	69,849	12,792.88	.....	.....	69,849	12,792.88
Saline.....	.....	.....	146,186	22,988.56	39,940	6,741.87	185,126	29,730.43
Joint Organization Atchafalaya Basin and Lafourche.....	.....	.....	51,585	12,380.40	.....	.....	51,585	12,380.40
Totals.....	1,030,978	200,823.43	3,200,646	\$739,745.48	198,073	\$44,048.27	4,429,697	\$984,617.18

SUMMARY.

Districts.....	741,000	\$119,990.35	12,495,283	\$2,798,406.84	3,052,685	\$611,939.62	16,289,568	\$3,530,396.81
State.....	1,030,978	200,823.43	3,200,646	739,745.48	198,073	44,048.27	4,429,697	984,617.18
Totals.....	1,772,078	\$320,813.78	15,695,929	\$3,538,212.32	3,250,758	\$655,987.89	20,719,265	\$4,515,913.99

The Board of State Engineers is indebted to the courtesy of Major J. R. Slattery, Corps of Engineers, U. S. A., for the following statements of levees built and enlarged and revetment built and maintained for levee protection by the United States in the Upper Tensas District in Arkansas and Louisiana, from April 20, 1912 to April 20, 1914.

Name of Contract	Parish or County	DATE OF		LINEAR FT.		Cubic Yards	Cost	Price—Cents	Stream	Remarks
		Contract	Final Certificate	New Loop	Enlargement					
IN ARKANSAS	Desha.....	Aug. 12, 1913	Sept. 18, 1913	4,900	7,138	\$ 1,890.86	26.49	Arkansas Riv.	{ New river washed away by flood of 1913. Does not include 5,010 Cu. Yds. forfeited, \$1,234.53 retained percent forfeited.
	Desha.....	Aug. 20, 1913	Mar. 3, 1914	.....	10,000	135,240	56,860.80	42.00	Arkansas Riv.
	Desha.....	Aug. 5, 1912	.....	.....	.....	35,272	11,110.67	35.00	Arkansas Riv.
	Desha.....	Aug. 20, 1913	Jan. 13, 1914	1,300	.....	89,007	44,503.50	50.00	Arkansas Riv.
	Desha.....	Oct. 28, 1912	Jan. 14, 1914	.....	.....	35,983	11,874.39	33.00	Arkansas Riv.
750 942-946 620-660 950-1020 1549-1630 1630-1710 1709-1744 1780-1750 1780-1790 1750-1780 1854-1910 2100-2150 2532-2535 3131-3145 3497*50-3499 3983*50-3987	Desha.....	Aug. 20, 1913	Jan. 9, 1914	450	16,462	7,078.66	43.00	Arkansas Riv.	{ Spur 1,000 ft. long. Cost of revetting end not included.
	Desha.....	Oct. 28, 1912	Jan. 17, 1914	.....	4,000	52,894	17,983.96	34.00	Mississippi Riv.
	Desha.....	Oct. 28, 1912	Sept. 12, 1913	.....	6,583	90,777	27,142.32	29.90	Mississippi Riv.
	Chicot.....	Oct. 28, 1912	Feb. 17, 1914	.....	8,100	109,760	34,034.90	31.00	Mississippi Riv.
	Chicot.....	Oct. 28, 1912	Sept. 6, 1913	.....	8,000	136,771	50,605.27	37.00	Mississippi Riv.
	Chicot.....	Aug. 20, 1913	Nov. 24, 1913	.....	3,000	47,264	19,850.88	42.00	Mississippi Riv.
	Chicot.....	Oct. 28, 1912	April 3, 1913	.....	2,000	33,392	11,019.36	33.00	Mississippi Riv.
	Chicot.....	Aug. 1, 1912	Feb. 5, 1913	3,000	.....	390,000	156,000.00	40.00	Mississippi Riv.
	Chicot.....	Oct. 28, 1912	Feb. 17, 1914	.....	5,600	72,312	24,586.08	34.00	Mississippi Riv.
	Chicot.....	Oct. 28, 1912	Mar. 16, 1914	.....	5,000	54,984	18,207.60	34.00	Mississippi Riv.
	Chicot.....	Oral agree'm't	Feb. 2, 1914	.....	300	6,106	2,198.16	36.00	Mississippi Riv.
	Chicot.....	Dec. 16, 1913	Feb. 2, 1914	.....	1,400	16,676	3,843.36	36.00	Mississippi Riv.
	Chicot.....	Dec. 16, 1913	Feb. 2, 1914	.....	190	5,697	2,050.92	36.00	Mississippi Riv.
	Chicot.....	Dec. 11, 1913	Feb. 16, 1914	.....	350	14,658	5,833.88	39.80	Mississippi Riv.
	Totals.....			4,300 or 0.8 miles.	59,833 or 11 1/2 miles.	1,344,423	\$506,615.57	37.68	Average price.	

Banquette to sub-levee.
Banquette extension.
Banquette extension.
Banquette extension.

APPENDIX A.

STATEMENT No. 14—Continued.

UNITED STATES LEVEES.

Name of Contract.	Parish or County.	DATE OF		LINEAR FT.		Cubic Yards	Cost	Price—Cents	Stream	Remarks
		Contract	Final Certificate	New Loop	Enlargement					
IN LOUISIANA										
1440-1540	East Carroll	Oct. 28, 1912	Sept. 13, 1913	.....	10,000	174,003	\$ 41,760.72	24.00	Mississippi Riv.	Beg. in prev. period.
2083-2135	East Carroll	Sept. 9, 1911	July 19, 1913	5,225	.....	60,687	8,011.68	13.20	Mississippi Riv.	Beg. in prev. period.
2135-2190	East Carroll	Sept. 9, 1911	July 19, 1913	5,500	.....	154,476	20,390.83	13.20	Mississippi Riv.	Beg. in prev. period.
2190-2254	East Carroll	Sept. 9, 1911	Aug. 3, 1912	6,400	.....	173,838	22,946.62	13.20	Mississippi Riv.	Beg. in prev. period.
2254-2310	East Carroll	Sept. 9, 1911	Aug. 19, 1912	5,449	.....	93,283	12,313.35	30.00	Mississippi Riv.	Beg. in prev. period.
2463-2489	East Carroll	July 29, 1912	Jan. 2, 1913	2,600	.....	191,324	57,397.20	30.00	Mississippi Riv.	Beg. in prev. period.
2489-2514	East Carroll	July 29, 1912	Jan. 14, 1913	2,500	.....	272,514	81,754.20	30.00	Mississippi Riv.	Beg. in prev. period.
2514-2539	East Carroll	Aug. 2, 1912	Jan. 3, 1913	2,500	.....	214,332	64,299.60	30.00	Mississippi Riv.	Beg. in prev. period.
2539-2565	East Carroll	Aug. 2, 1912	Feb. 7, 1913	2,548	.....	223,883	67,764.00	30.00	Mississippi Riv.	Banquette extension.
2463-2480	East Carroll	Aug. 6, 1913	Jan. 12, 1914	.....	1,710	28,387	8,232.23	29.00	Mississippi Riv.	Repair
2463-2565	East Carroll	Aug. 6, 1913	Jan. 12, 1914	.....	.....	5,385	1,735.65	29.00	Mississippi Riv.	Add 1 banquette extension.
2459-2488	East Carroll	Dec. 8, 1913	Feb. 7, 1914	.....	.....	17,058	3,872.16	22.70	Mississippi Riv.	
3520*84-3534	Nadison	Aug. 18, 1913	Jan. 9, 1914	1,347	.....	94,767	38,854.47	41.00	Mississippi Riv.	
3534-3547	Nadison	Aug. 26, 1913	Jan. 14, 1914	1,300	.....	106,103	45,518.19	42.90	Mississippi Riv.	
3547-3551	Nadison	Aug. 4, 1913	Jan. 10, 1914	1,400	.....	115,578	43,719.64	38.00	Mississippi Riv.	
3561-3578	Nadison	Aug. 4, 1913	Dec. 18, 1913	1,700	.....	101,088	26,282.88	26.00	Mississippi Riv.	
3578-3605*30	Nadison	Aug. 4, 1913	Dec. 18, 1913	2,657	.....	107,007	23,274.03	21.75	Mississippi Riv.	
3601-3614*80	Nadison	Feb. 5, 1914	Feb. 24, 1914	.....	.....	7,573	1,514.60	20.00	Mississippi Riv.	
Totals.....						2,143,886	\$569,042.95	26.57	Average price.	{ Enlargement of old levee for spur 1,085 Lin. Ft.
				41,126 or 7.8 miles.	11,710 or 2.2 miles.					

APPENDIX A. STATEMENT No. 14—Continued. UNITED STATES LEVEES.

REVEMENT

NAME OF LOCALITY	Miles Below Cairo	Length April 1, 1912	Length Added During Period	Total Length April 1, 1914	Expenditures, Includ- ing New Work and Maintenance
Panther Forest, Ark.....	452 R	4,150	1,100	5,250	*\$112,822.43
Leland Neck, Ark.....	471 R	5,200	.....	5,200	1,775.26
Vauchuse, Ark.....	487 R	3,700	.....	3,700	702.97
Grand Lake, Ark.....	509 R	4,000	.....	4,000	12,402.09
Louisiana Bend, La.....	522 R	11,300	.....	11,300	1,903.46
Lake Providence, La.....	540 R	12,600	.....	12,600	2,219.94
Delta Point, La.....	598 R	5,900	.....	5,900	†40,452.34
Reid-Bedford, La.....	603 R	6,380	.....	6,380	†41,540.00
Totals.....		53,230	1,100	54,330	\$213,818.49

* 2,000 feet existing work was rebuilt.

† 1,000 feet existing work was rebuilt.

‡ 1,000 feet existing work was rebuilt.

APPENDIX A.

STATEMENT No. 15.

UNITED STATES LEVEES.

The Board of State Engineers is indebted to the courtesy of Major C. O. Sherrill, Corps of Engineers, U. S. A., for the following statements of levees built and enlarged and revetment built by the United States in the Fourth District, improving Mississippi River from opposite Warrenton, Miss., to Head of Passes, Louisiana, from April 20, 1912 to April 20, 1914.

NAME OF LEVEE	Miles Below Cairo	Date of Contract	Date of Completion	New Levee— Linear Feet	Enlargement— Linear Feet	Cubic Yards	Cost	Method
LOWER TENSAS LEVEE DISTRICT.								
Palmyra No. 1 and No. 2.....	622.5	R Aug. 15, 1912	Oct. 22, 1912	957	.....	11,028.96	\$ 2,757.24	
Ursino.....	625	R Oct. 17, 1913	Feb. 23, 1914	1,314	.....	24,389.43	6,072.97	
Winquaters.....	639	R Oct. 10, 1911	Feb. 23, 1914	.....	13,924	132,951.20	26,457.29	
Duck Pond.....	648	R Dec. 11, 1912	Feb. 4, 1914	.....	6,327	41,412.70	11,015.78	
Ingenfield, Lot No. 1.....	648	R Mar. 31, 1913	Jan. 26, 1914	2,706	396	145,932.39	27,581.22	
Ingenfield, Lot No. 2.....	648	R June 25, 1913	Jan. 20, 1914	2,100	.....	133,754.71	39,002.87	
Ingenfield, Lot No. 3.....	648	R June 25, 1913	Jan. 20, 1914	1,500	.....	141,939.33	41,389.51	
Ingenfield, Lot No. 4.....	648	R June 25, 1913	Jan. 20, 1914	2,339	.....	146,857.41	42,823.62	
Harpers.....	657	R Dec. 11, 1912	Nov. 28, 1913	.....	5,063	95,793.76	19,034.22	
Vauchuse, Lot No. 1.....	654	R June 25, 1913	Feb. 23, 1914	1,970	.....	186,451.43	63,393.49	
Vauchuse, Lot No. 2.....	654	R June 25, 1913	Feb. 23, 1914	3,918	.....	177,067.46	60,202.04	
Sycamore.....	692	R Dec. 11, 1912	Jan. 12, 1914	.....	10,830	124,721.57	24,620.04	
Minorca.....	694	R Dec. 11, 1912	April 20, 1914	.....	8,600	110,189.06	23,139.70	
Taconcy.....	696	R Dec. 11, 1912	April 20, 1914	.....	.....	104,952.00	18,576.50	
Palo Alto.....	699	R Aug. 20, 1913	Dec. 22, 1913	2,245	.....	51,288.08	11,232.09	
Palo Alto.....	699	R Oct. 10, 1911	Aug. 14, 1913	.....	9,251	95,667.94	13,776.18	
Arnaudlin.....	701	R Oct. 10, 1911	Aug. 8, 1913	1,880	3,970	69,892.29	8,876.32	
White Hall.....	703	R Oct. 10, 1911	Nov. 30, 1913	2,040	4,915	102,320.59	12,994.71	
Scotland.....	705	R Dec. 11, 1912	Nov. 3, 1913	.....	13,700	140,495.41	23,532.98	
Lucerna.....	707	R Dec. 11, 1912	Oct. 27, 1913	3,119	10,756	147,628.00	24,727.69	
Morville.....	710	R Dec. 11, 1912	Oct. 13, 1913	.....	16,659	142,400.68	23,904.14	

APPENDIX A.

STATEMENT No. 15—Continued.

UNITED STATES LEVEES.

722 R	Dec.	11,	1912	Mar.	14,	1914	9,203	95,755.92	26,715.90
Union Point.....	Sept. 12,	1913	April	20,	1914	.....	14,200	109,130.00	15,278.20
Black Hawk.....	Sept. 30,	1912	Nov.	5,	1912	1,781	.....	2,656.47	743.81
746 R	Sept. 12,	1913	Nov.	28,	1914	.....	20,155	156,870.80	21,961.91
Black Hawk.....	Sept. 30,	1912	Nov.	5,	1912	1,745	.....	36,225.00	5,071.50
747-5 R	Sept. 12,	1913	April	20,	1914	.....	.....	9,097.70	2,547.36
Withalacouchie.....	Sept. 30,	1912	Nov.	5,	1912	1,187	.....	.....	.....
751 R	Sept. 30,	1912	Nov.	5,	1912	.....	.....	.....	.....
Withalacouchie.....	Sept. 30,	1912	Nov.	5,	1912	.....	.....	.....	.....
753 R	Sept. 30,	1912	Nov.	5,	1912	.....	.....	.....	.....
Knox.....	Sept. 30,	1912	Nov.	5,	1912	.....	.....	.....	.....
Totals.....	.....	.....	.....	.....	.....	30,801	160,249	2,736,870.29	\$603,430.18

ATCHAFALAYA LEVEE DISTRICT.

786 R	Oct.	4,	1912	Jan.	7,	1914	3,832	253,836.79	\$ 63,205.36
New Texas.....	Oct. 17,	1913	Feb.	19,	1914	.....	.....	19,581.91	5,776.66
New Texas Banquette.....	Oct. 14,	1912	July	15,	1913	4,476	.....	157,494.34	36,853.68
St. Francis Church.....	Oct. 14,	1912	Aug.	4,	1913	1,739	.....	*65,413.42	16,353.36
Lakeland.....	Oct. 14,	1912	Aug.	4,	1913	1,739	.....	101,906.22	23,846.06
800 R	Sept. 6,	1913	Feb.	24,	1914	2,187	.....	151,906.22	23,846.06
Catherine.....	Sept. 6,	1913	Feb.	24,	1914	2,187	.....	151,906.22	23,846.06
825 R	Dec. 11,	1912	Mar.	24,	1913	1,593	.....	151,906.22	23,846.06
Plaquemine.....	Dec. 11,	1912	Mar.	24,	1913	1,593	.....	151,906.22	23,846.06
851.5 R	Dec. 11,	1912	Mar.	24,	1913	1,593	.....	151,906.22	23,846.06
Plaquemine.....	Dec. 11,	1912	Mar.	24,	1913	1,593	.....	151,906.22	23,846.06
Dunboyne.....	Sept. 26,	1913	Feb.	5,	1914	966.5	.....	37,187.00	8,329.90

(*) Includes two wings of 1,529.49 cubic yards and 4,433.06 cubic yards.

†) Including 5,528.17 cubic yards built as a wing to hold rise of February, 1913.

LAFOURCHE LEVEE DISTRICT.

923 R	Sept. 26,	1911	April	2,	1913	.....	1,605	10,366.12	\$ 1,969.56
White Rose.....	Sept. 6,	1913	Jan.	22,	1914	.....	.....	51,923.68	12,814.76
Luey.....	Sept. 20,	1912	Feb.	23,	1913	.....	1,591	*12,824.04	1,220.85
930 R	Aug. 20,	1912	Jan.	23,	1913	.....	.....	93,905.18	23,476.90
Hymelia.....	Aug. 20,	1912	Jan.	23,	1913	4,222	.....	\$149,701.80	61,272.95
932 R	Sept. 23,	1912	Feb.	26,	1913	1,100	.....	27,029.96	14,596.18
Hymelia Dyke.....	Sept. 23,	1912	Feb.	26,	1913	1,100	.....	38,852.24	11,519.69
Star.....	Sept. 23,	1912	Feb.	26,	1913	1,100	.....	18,203.01	3,458.57
934 R	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
Ashton.....	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
943 R	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
946.7 R	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
Louisa.....	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
Fairfield, Upper.....	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
954 R	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
Fairfield.....	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
954 R	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
Fairfield.....	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
961 R	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00
Beil.....	Sept. 26,	1913	Jan.	6,	1913	.....	3,624	94,000.00	20,210.00

†) Built by U. S. Levee Machine, and includes fixed charges for interest and deterioration of plant.

§) Of this amount, 76,911.09 cubic yards were placed by the dredge Pascagoula at a cost of \$12,501.03; the remainder was placed on rising river as emergency work.

¶) Will be completed about May 1, 1914.

††) Quantity given is what will be in place April 20, 1914.

APPENDIX A.

STATEMENT No. 15—Continued.

UNITED STATES LEVEES

PONTCHARTRAIN LEVEE DISTRICT.

NAME OF LEVEE	Miles Below Cairo	Date of Contract	Date of Completion	New Levee Linear Feet	Enlargement— Linear Feet	Cubic Yards	Cost	Method
Bagatelle.....	863	Oct. 14, 1912	July 21, 1913	1,542	.....	58,659.02	\$ 14,664.76	
Southwood.....	876	Aug. 20, 1913	.....	3,573	.....	133,512.14	33,319.16	
Dicharry.....	882	Dec. 28, 1912	.....	8,337	.....	328,087.62	39,053.77	
St. Elmo.....	914	Oct. 14, 1912	May 31, 1913	3,120	.....	95,019.16	21,217.78	
Boisblanc.....	951	Sept. 23, 1913	Jan. 20, 1914	1,553	.....	42,498.61	10,624.65	

(†) Will be completed by April 20, 1914.

BARATARIA LEVEE DISTRICT.

Concession.....	990	Sept. 6, 1913	Jan. 21, 1914	3,369	.....	56,275.88	\$ 13,050.38	Contract.
Sarah.....	994	Sept. 11, 1912	Oct. 8, 1912	1,508	.....	28,236.12	3,405.21	U. S. Levee Mch.
Barrios.....	995	Nov. 11, 1912	Dec. 16, 1912	2,039	.....	36,291.28	4,245.31	U. S. Levee Mch.
St. Rosalie.....	1003	Dec. 11, 1912	Feb. 12, 1914	.....	7,438	25,508.10	4,270.06	Contract.
Woodland.....	1012	Nov. 24, 1913	Jan. 14, 1914	.....	8,184	36,830.33	4,809.63	U. S. Levee Mch.
Socola.....	1018	Sept. 6, 1913	Nov. 11, 1913	.....	2,006	4,052.38	921.51	Contract.
Upper Riceland.....	1019	Sept. 26, 1913	Feb. 21, 1914	1,275	.....	20,101.80	7,269.05	Contract.
Riceland.....	1019.5	Sept. 6, 1913	Mar. 9, 1914	2,454	.....	31,020.72	8,076.52	Contract.

APPENDIX A.

STATEMENT No. 15—Continued.

UNITED STATES LEVEES.

Happy Jack.....	1021	R	Dec. 27, 1912	Nov. 15, 1913	7,360	.....	72,034.47	8,405.93	U. S. Levee Mch.
Butler.....	1024	R	Sept. 6, 1913	Nov. 15, 1913	1,604	.....	13,181.48	2,368.71	Contract.
Chantillon.....	1024.5	R	Jan. 22, 1914	Feb. 5, 1914	1,548	.....	14,433.75	1,559.98	U. S. Levee Mch.
Home Place.....	1026	R	Oct. 16, 1912	Oct. 29, 1912	1,842	.....	16,290.33	1,371.25	U. S. Levee Mch.
Cognovitch.....	1029	R	Apr. 14, 1913	May 2, 1913	2,986	.....	9,018.47	1,354.44	U. S. Levee Mch.
Cognovitch.....	1029	R	Nov. 18, 1912	May 10, 1913	1,233	.....	8,608.44	1,645.27	Contract.
Fort Jackson.....	1043	R	Oct. 15, 1913	April 20, 1914	1,233	.....	9,718.17	2,507.29	Contract.

NOTE—Under "Date of Contract" the dates given for the levee machine are the dates of the beginning of work.

Charges for levee machine work include every item of expense, plus interest on the investment during the time machine is not employed, and for deterioration of plant.
Happy Jack Levee was not worked on continuously during the time here given.

LAKE BORGNE LEVEE DISTRICT.

Story to Millaudon.....	980	L	Dec. 11, 1912	Under way....	.....	13,938	65,900.00	\$ 13,476.55	Contract, April 20, 1914.
Caernarvon.....	983	L	Sept. 6, 1913	Under way....	3,308	.....	100,000.00	24,740.00	Contract, April 20, 1914.
Kenilworth.....	984	L	Dec. 11, 1912	Jan. 19, 1914	.....	4,421	30,605.45	6,184.56	Contract.
Mon Plaisir.....	987	L	Dec. 11, 1912	Jan. 19, 1914	.....	3,981	22,862.38	3,872.89	Contract.
Stella.....	990	L	Dec. 11, 1912	Mar. 24, 1914	1,078	.....	61,421.84	10,282.02	Contract.
Bohemia.....	1018	L	Feb. 12, 1914	Feb. 28, 1914	1,838	.....	13,637.31	1,731.44	U. S. Levee Mch.
Cannon.....	1022	L	Aug. 19, 1912	Dec. 7, 1912	746	.....	1,856.94	393.49	Contract
Vogt.....	1028	L	Dec. 11, 1912	Under way....	2,544	1,488	27,543.80	4,654.90	Contract comp. by April 20, 1914.
Harris Canal.....	1029	L	Sept. 6, 1913	Dec. 5, 1913	1,984	.....	21,073.03	4,886.84	Contract.
Brophy.....	1039	L	May 1, 1912	May 13, 1912	.....	Approx. 3,000	11,139.31	1,264.26	U. S. Levee Mch.
Ft. St. Philip to Olga.....	1043.6	L	Mar. 11, 1913	July 7, 1913	.....	18,222	73,400.49	7,668.04	U. S. Levee Mch.
Ostrica.....	1039	L	Mar. 13, 1914	April 30, 1914	.....	Approx. 1,800	10,900.00	1,300.00	U. S. Levee Mch.

NOTE—Under "Date of Contract," the dates given for the levee machine are the dates of the beginning of work.

Cost of U. S. Levee Machine work includes a proportionate cost of all repairs and fixed charges for interest on investment and for deterioration of plant.

LOWER TENSAS LEVEE DISTRICT.
Sheet Piling and Concrete Revetment.

NAME OF LEVEE	Miles Below Cairo	Date of Contract	Date of Completion	New Levee Linear Feet	Enlargement Linear Feet	Cubic Yards	Cost	Method
White Oak Lake.....	632 R	Oct. 2, 1912	Mar. 18, 1913	5,105	(Sheet Piling	.....	\$ 20,092.01	
Arnauldia.....	701 R	Sept. 4, 1913	Dec. 23, 1913	415	(Sheet Piling	.....	975.25	
Arnauldia.....	701 R	Sept. 5, 1913	Mar. 6, 1914	8,213.09	(Sheet Piling concrete revt.	.....	6,488.35	
							\$ 27,555.61	

LEVEES, EAST BANK OF MISSISSIPPI RIVER.

Ashland.....	662 L	Aug. 20, 1912	Dec. 11, 1912	3,891	.....	27,052.96	\$ 7,980.62	
Cow Pen Neck.....	689 L	Oct. 14, 1912	Jan. 8, 1913	300	.....	9,876.48	2,261.71	
Artonish.....	747 L	Sept. 6, 1912	Dec. 10, 1912	2,088	.....	10,873.83	2,707.58	
Deer Park.....	750 L	Sept. 6, 1912	Oct. 23, 1912	842	.....	3,992.30	1,894.08	
Deer Park.....	750 L	Oct. 17, 1913	Dec. 22, 1913	1,430	.....	9,179.92	1,833.98	
Bayou Sura.....	801 L	Aug. 15, 1912	Sept. 23, 1912	196	.....	4,612.01	1,498.90	
			Totals.....	8,747	.....	65,587.50	17,278.87	

LEVEES, ATCHAFALAYA RIVER.

Alto.....		Aug. 22, 1912	Feb. 18, 1913	6,475	192,270.25	\$ 54,604.75	
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ATCHAFALAYA LEVEE DISTRICT.

Sheet Piling, Concrete and Wooden Revetment.

NAME OF LEVEE		Miles Below Cairo	Date of Contract	Date of Completion	Concrete—Square Yards	Timber—Line ar Feet	Piling, Sheet, Linear Feet	Cost
LAFOURCHE LEVEE DISTRICT.								
Grand Bay	807	R	Dec. 9, 1912	Nov. 4, 1913			1,225	\$ 6,999.19
BARATARIA LEVEE DISTRICT.								
Sheet Piling and Concrete and Wooden Revetment.								
Myrtle Grove	1005.5	R	Dec. 5, 1913	Feb. 13, 1914	Repair 717.00			\$ 321.78
Riceland	1019	R	Mar. 2, 1914	April 20, 1914	6,600.00	4,000.00		6,204.00
Happy Jack	1021	R		Approx.				4,226.86
Happy Jack	1022	R	Nov. 6, 1913	April 20, 1914	13,000.00			10,920.00
Butler	1024	R	Dec. 8, 1913	Feb. 13, 1914	3,638.23			3,381.74
Home Place	1026	R				1,842.00		1,264.64
Cognovitch	1029	R				3,100.00		2,385.90
LAKE BORGNE LEVEE DISTRICT.								
Jacomie	1037	L				7,000.00		\$ 4,452.26

PLACE	1912-1913 Linear Feet		1913-1914 Linear Feet		Total in Place to April 20, 1914 Linear Feet
	BANK REVETMENT TO APRIL 20, 1914.				
Hard Times.....	.....	.....	4,100	4,100	4,100
Bondurant.....	.....	.....	600	4,150	4,150
Kemp.....	3,800	No extension	No extension	28,616	28,616
Giles.....	Maintenance only	Maintenance only	Maintenance only	16,000	16,000
Marengo.....	5,600	7,464	7,464	12,864	12,864
Plaquemine.....	2,260	1,050	1,050	3,775	3,775
New Orleans Harbor.....	1,500	2,800	2,800	50,015	50,015
Avondale.....	.....	1,615	1,615	1,615	1,615
Totals.....	13,160	17,629	17,629	121,135	121,135

Recapitulation of work done from April 20, 1912 to April 20, 1914, as shown by the foregoing.

NAME OF DISTRICT.	Miles of		Cubic Yards	Cost	Total Cost
	New Levee	Enlarge- ment			
LEVEE WORK.					
Upper Tensas in Arkansas.....	0 80	11 33	1,344,423	\$ 506,615.57	
Upper Tensas in Louisiana—Fifth Louisiana Levee Dist.....	7 80	2 20	2,143,886	569,642.95	
Lower Tensas—Fifth Louisiana Levee Dist.....	5 83	30 35	2,736,870	603,430.18	
Atchafalaya Basin.....	2 80	0 47	690,233	169,438.62	
Pontchartrain.....	3 43	..	677,777	139,182.12	
Latourche.....	5 41	7 23	968,302	203,879.43	
Lake Borgne Basin.....	1 18	6 03	291,477	60,287.46	
Grand Prairie.....	0 99	4 64	145,014	20,167.53	
Buras.....	2 37	0 56	143,345	19,812.92	
Red River, Atchafalaya and Bayou Boeuf.....	1 22	.....	192,270	54,604.75	
Totals.....	32 06	62 81	9,336,597	\$2,347,061.53	\$2,347,061.53

BANK REVETMENT.

	Lin.	Ft.		\$
Upper Tensas in Louisiana—Fifth Louisiana Levee Dist.	1,100		\$213,818.49	
Lower Tensas—Fifth Louisiana Levee Dist.	14,100	cost not given		\$ 213,818.49
Atchafalaya Basin.	3,310	cost not given		
Orleans.	4,300	cost not given		
Lafourche.	1,615	cost not given		
Totals.	24,425			

WOODEN SHEET PILING.

	Lin.	Ft.		\$
Fifth Louisiana.	5,320		\$ 21,067.26	
Atchafalaya Basin.	1,225		6,999.19	
Lafourche.	8,942		7,877.40	
Totals.	15,687		\$ 35,943.85	\$ 35,943.85

CONCRETE REVETMENT.

	Sq.	Yds.		\$
Fifth Louisiana.	8,213		\$ 6,488.35	
Lafourche.	12,296		10,702.28	
Lake Borgne Basin.	7,000		4,452.26	
Buras.	18,638		14,301.74	
Totals.	44,147		\$ 35,944.63	\$ 35,944.63
			Grand Total. .	\$2,632,768.50

APPENDIX A. STATEMENT No. 16. SUMMARY ACCORDING TO DISTRICTS.

Approximate quantities and cost of work in the several Levee Districts of Louisiana and in Desha and Chicot Counties Arkansas, from April 20, 1912 to April 20, 1914, by the Districts, State of Louisiana and the United States, as shown in the foregoing statements.

NAME OF LEVEE DISTRICT.	BY WHOM DONE.	MILES OF		Cubic Yards	Cost
		New Levee	Enlargement		
Tensas Basin—In Arkansas.....	{ District.....	0.57	13.47	1,174,735	\$ 262,544.72
	{ United States.....	0.80	11.33	1,344,423	506,615.57
Totals.....		1.37	24.80	2,519,158	\$ 769,160.29
Fifth Louisiana.....	{ District.....	3.02	19.29	2,529,230	\$ 546,657.11
	{ State.....	0.92	14.89	1,077,838	302,917.57
Totals.....	{ United States.....	13.63	32.55	4,880,736	1,173,573.13
Atchafalaya Basin.....	{ District.....	17.57	66.73	8,487,833	\$2,021,947.84
	{ State.....	8.09	24.87	3,518,310	\$ 915,998.25
Totals.....	{ United States.....	2.24	1.06	373,736	73,365.63
Ponchartrain.....	{ District.....	13.13	26.40	4,582,279	\$1,158,802.50
	{ State.....	2.81	11.93	1,849,478	435,134.34
Totals.....	{ United States.....	1.06	.....	186,410	44,205.81
Lafourche.....	{ District.....	7.30	11.93	2,713,665	\$ 618,522.27
	{ State.....	1.13	6.73	479,772	\$ 99,883.26
Totals.....	{ United States.....	2.45	0.30	296,881	62,382.60
Totals.....	{ District.....	5.44	7.23	968,302	203,879.43
	{ United States.....	9.02	14.26	1,744,955	\$ 366,145.29

APPENDIX A. STATEMENT No. 16—Continued. SUMMARY ACCORDING TO DISTRICTS.

Orleans.....	District.....	5.84	4.01	911,907	\$ 271,707.11
Lake Borgne Basin.....	{ District.....	0.65	0.76	97,501	\$ 27,617.03
	{ State.....	0.60	4.05	161,066	39,863.94
	{ United States.....	1.18	6.03	294,477	60,287.46
Totals.....		2.43	10.84	553,044	\$ 127,769.03
Grand Prairie.....	{ State.....	0.26	1.74	28,414	\$ 5,054.77
	{ United States.....	0.99	4.64	145,014	20,167.53
Totals.....		1.25	6.38	173,428	25,222.30
Buras.....	{ State.....	1.05	1.51	70,959	\$ 15,981.90
	{ United States.....	2.57	0.56	143,345	19,812.92
Totals.....		3.62	2.07	214,304	35,794.82
Plaquemines Parish East Bank.....	State.....	0.31	2.68	31,521	6,412.48
Caddo.....	District.....	11.29	14.08	1,504,413	\$ 254,605.83
Bossier.....	State.....	2.77	.....	196,047	\$ 29,711.97
Bossier Sub-District.....	State.....	0.74	0.51	26,362	\$ 6,189.55
	{ District.....	10.61	19.85	1,341,835	\$ 256,025.67
	{ State.....	1.09	8.88	298,999	74,157.83
Red River, Atchafalaya and Bayou Boeuf.....	{ United States.....	1.22	.....	192,270	54,604.75
Totals.....		12.92	28.73	1,833,104	\$ 384,788.25
Natchitoches Sub-District.....	State.....	0.93	4.43	188,793	\$ 32,109.59
Red River and Bayou des Glaizes Levee and Drainage.....	State.....	0.71	.....	66,849	\$ 17,722.88
Saline Levee and Drainage.....	State.....	0.16	3.79	145,186	\$ 22,988.56
Joint Organization, Atchafalaya Basin and Lafourche.....	State.....	0.22	.....	51,585	\$ 12,380.40

APPENDIX A. STATEMENT No. 17. SUMMARY ACCORDING TO DISTRICTS.

RECAPITULATION

NAME OF LEVEE DISTRICT.	MILES OF		Cubic Yards	Cost
	New Levee	Enlargement		
IN ARKANSAS.				
Tensas Basin.....	1.37	24.80	2,519,158	\$ 769,160.29
IN LOUISIANA.				
Fifth Louisiana.....	17.57	66.73	8,487,833	2,021,947.84
Atchafalaya Basin.....	13.13	26.40	4,582,279	1,158,802.50
Pontchartrain.....	7.30	11.93	2,713,665	618,522.27
Lafourche.....	9.02	14.26	1,744,955	366,145.29
Orleans.....	5.84	4.01	911,907	271,707.11
Lake Borgne Basin.....	2.43	10.84	553,044	127,769.03
Grand Prairie.....	1.25	6.38	173,428	25,222.30
Buras.....	3.62	2.07	214,304	35,794.82
Plaquemines Parish East Bank.....	0.31	2.68	31,521	6,412.48
Caddo.....	11.29	14.08	1,504,413	254,605.83
Bossier.....	2.77	.....	196,047	29,711.97
Bossier Sub-District.....	0.74	0.51	26,362	6,189.55
Red River, Atchafalaya and Bayou Boeuf.....	12.92	28.73	1,833,104	384,788.25
Natchitoches Sub-District.....	0.93	4.43	188,793	32,109.59
Red River and Bayou des Glaizes Levee and Drainage.....	0.74	.....	66,849	12,722.88
Saline Levee and Drainage.....	0.16	3.79	145,186	22,988.56
Joint Organization Atchafalaya Basin and Lafourche Districts.....	0.22	.....	51,585	12,380.40
Totals.....	91.61	221.64	25,944,433	\$6,156,980.96

APPENDIX A.

STATEMENT No. 18.

SUMMARY ACCORDING TO STREAMS

Approximate quantities and cost of levee work in the several Levee Districts of Louisiana, and Desha and Chicot Counties, Arkansas, from April 20, 1912 to April 20, 1914, by the Districts, the State of Louisiana and the United States as shown in the foregoing statements.

STREAM	LEVEE DISTRICT.	BY WHOM DONE.	MILES OF		Cubic Yards	Cost
			New Levee	Enlargement		
IN ARKANSAS.						
Arkansas River.....	Tensas Basin.....	United States.....	0.25	3.66	371,996	\$ 151,242.84
Mississippi River.....	Tensas Basin.....	{ District..... { United States.....	0.57 0.55	13.47 7.67	1,174,735 972,427	\$ 262,544.72 355,372.73
	Totals.....		1.12	21.14	2,147,162	\$ 617,917.45
IN LOUISIANA.						
	Fifth Louisiana.....	{ District..... { State..... { United States.....	3.02 0.92 13.63	19.29 14.89 32.55	2,529,239 1,077,538 4,880,756	\$ 546,657.14 302,217.57 1,173,073.13
	Totals.....		17.57	66.73	8,487,833	\$2,021,947.84
	Atchafalaya Basin.....	{ District..... { State..... { United States.....	3.85 1.51 2.80	15.40 1.06 0.47	2,223,651 249,529 690,233	\$ 505,866.71 46,040.09 169,438.62
	Totals.....		8.16	16.93	3,163,413	721,345.42
Mississippi River.....	Pontchartrain.....	{ District..... { State..... { United States.....	2.81 1.06 3.43	11.93	1,849,478 186,410 677,777	435,134.34 44,205.81 139,182.12
	Totals.....		7.30	11.93	2,713,665	618,522.27

APPENDIX A. STATEMENT No. 18—Continued. SUMMARY ACCORDING TO STREAMS.

STREAM.	LEVEE DISTRICT.	BY WHOM DONE.	MILES OF		Cubic Yards	Cost
			New Levee	Enlargement		
Mississippi River—Continued	Lafourche.....	{ District..... State..... United States.....	1.13 2.45 5.44	6.73 0.30 7.23	479,772 296,881 968,302	\$ 99,883.26 \$ 62,382.60 \$ 203,879.43
	Totals.....		9.02	14.26	1,744,955	\$ 366,145.29
	Orleans.....	District.....	3.27	4.01	859,995	\$ 253,594.16
	Lake Borgne Basin.....	{ District..... State..... United States.....	0.65 0.60 1.18	0.76 4.03 6.03	97,501 161,066 294,477	\$ 27,617.63 \$ 39,863.94 \$ 60,287.46
	Totals.....		2.43	10.84	553,044	\$ 127,769.03
	Grand Prairie.....	{ State..... United States.....	0.26 0.99	1.74 4.64	28,414 145,014	\$ 5,054.77 \$ 20,167.53
	Totals.....		1.25	6.38	173,428	\$ 25,222.30
	Buras.....	{ State..... United States.....	1.05 2.57	1.51 0.56	70,959 143,345	\$ 15,981.90 \$ 19,812.92
	Totals.....		3.62	2.07	214,304	\$ 35,794.82

APPENDIX A. STATEMENT No. 18—Continued.

SUMMARY ACCORDING TO STREAMS.

	Caddo.....	District.....	11. 29	14. 08	1,504,413	\$ 254,605. 83
	Bossier.....	State.....	2. 77	.....	196,047	\$ 29,711. 97
	Bossier Sub-District.....	State.....	0. 74	0. 51	26,362	\$ 6,189. 55
Red River.....	Red River, Atchafalaya and Bayou Boeuf.....	State.....	0. 22	2. 20	73,524	\$ 12,791. 16
	Natchitoches Sub-District.....	State.....	0. 93	4. 43	188,793	\$ 32,109. 59
	Red River and Bayou des Glaizes Levee and Drainage.....	State.....	0. 74	.....	66,849	\$ 12,772. 88
	Saline Levee and Drainage.....	State.....	0. 16	3. 79	145,186	\$ 22,988. 56
	Atchafalaya Basin.....	(District..... State.....)	4. 24 0. 73	9. 47	1,294,659 124,207	\$ 410,131. 54 27,325. 51
	Totals.....		4. 97	9. 47	1,418,866	\$ 437,457. 08
Atchafalaya River.....	Red, River, Atchafalaya and Bayou Boeuf.....	(District..... State..... United States.....)	4. 21 0. 87 1. 22	19. 85 5. 92	1,160,640 203,033 192,270	\$ 234,879. 39 37,552. 53 54,604. 75
	Totals.....		6. 30	25. 77	1,555,943	\$ 347,036. 67
Bayou Rapides.....	Red River, Atchafalaya and Bayou Boeuf.....	State.....		0. 76	22,442	\$ 3,815. 14
Bayou des Glaizes.....	Red River, Atchafalaya and Bayou Boeuf.....	District.....	6. 40	.....	181,195	\$ 21,146. 28
Gulf Coast.....	Plaquemines Parish East Bank.....	State.....	0. 31	2. 68	31,521	\$ 6,412. 48
Interior Streams.....	Orleans.....	District.....	2. 57	.....	51,912	\$ 18,112. 95

APPENDIX A. STATEMENT No. 19. SUMMARY ACCORDING TO STREAMS.
RECAPITULATION.

STREAM	MILES OF		Cubic Yards	Cost
	New Levee	Enlargement		
Arkansas River in Arkansas.....	0.25	3.66	371,996	\$ 151,242.84
Mississippi River in Arkansas.....	1.12	21.14	2,147,162	617,917.45
Mississippi River in Louisiana.....	52.84	133.15	17,962,222	4,182,670.53
Red River.....	16.85	28.01	2,201,774	371,169.54
Atchafalaya River.....	11.27	35.24	2,974,806	784,493.75
Bayou Rapides.....	.....	0.76	22,442	3,815.14
Bayou des Glazes.....	6.40	.....	181,195	21,146.28
Gulf Coast.....	0.31	2.68	31,321	6,412.48
Interior Streams.....	2.57	.....	51,912	18,112.95
Totals.....	91.61	221.64	25,944,433	\$6,156,908.96

GRAND TOTAL.

BY WHOM DONE.	MILES OF		Cubic Yards .	Cost	Total Cost
	New Levee	Enlargement			
LEVEE WORK.					
Districts.....	44.01	114.99	13,407,190	\$3,070,173.95	
State.....	15.54	43.84	3,200,646	739,745.48	
United States.....	32.06	62.81	9,336,597	2,347,061.53	
Totals.....	91.61	221.64	25,944,433	\$6,156,980.96	\$6,156,980.96
WOODEN REVETMENTS.					
Districts.....			Linear Ft.	\$ 22,566.81	
State.....			19,141	33,589.77	
United States.....			38,348	35,943.85	
Totals.....			73,212	\$ 92,100.43	\$ 92,100.43
CONCRETE PAVING OR REVETMENT.					
Districts.....			Square Yds.	\$ 1,270.87	
State.....			1,686	17,338.05	
United States.....			19,815	25,944.63	
Totals.....			44,147	\$ 54,573.55	\$ 54,573.55
IMPROVING BAYOU LAFOURCHE.					
Districts.....	Concrete paving or Revt.	Wakefield Sheet Piling	Steel Sheet Piling		
State.....	Sq. Yards	Lin. Feet	Lin. Feet		
United States.....	9,964	1,789	326	\$ 36,431.73	\$ 36,431.73
Totals.....					
State.....					

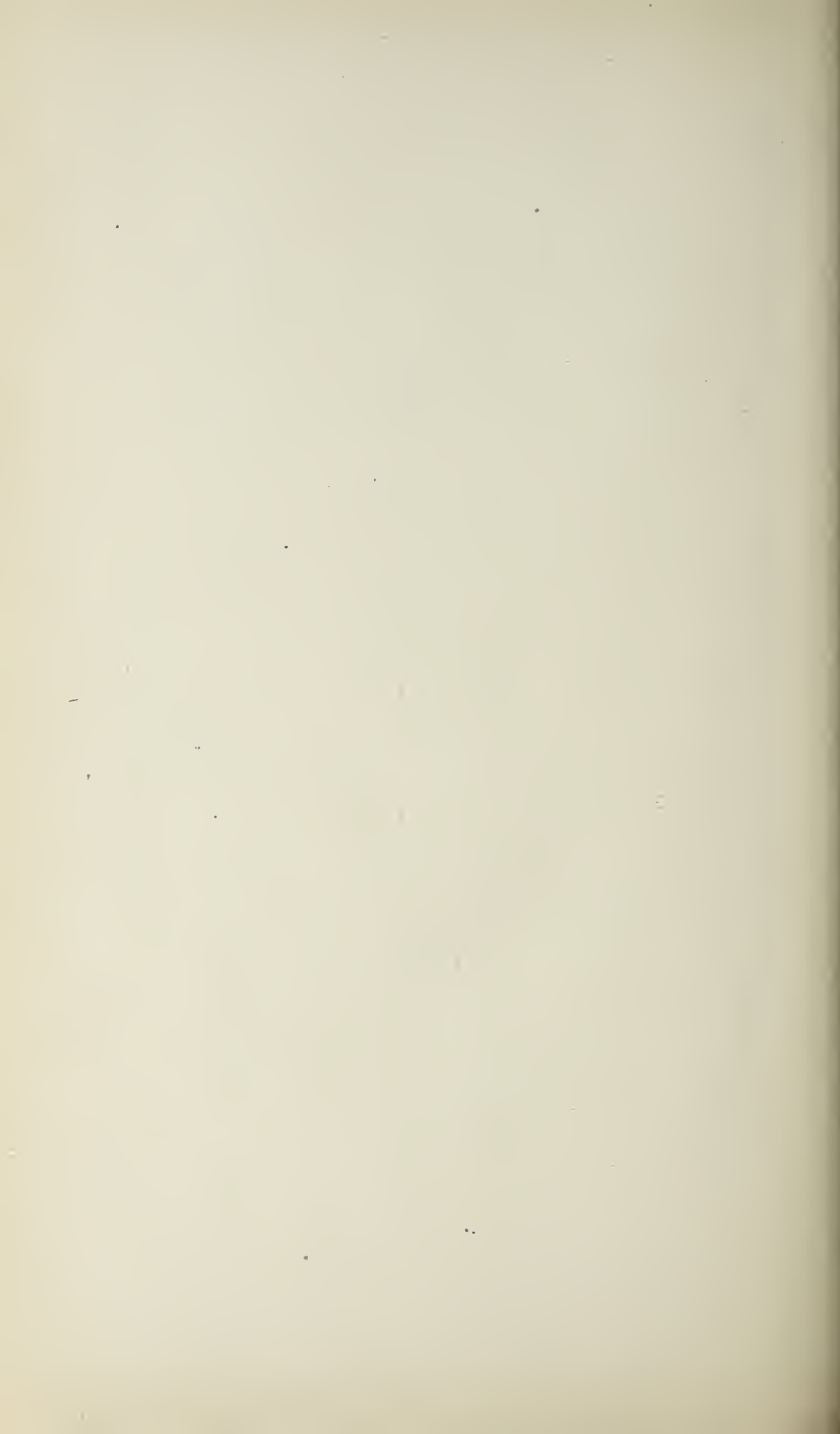
APPENDIX A.

STATEMENT No. 20—Continued.

SUMMARY.

GRAND TOTAL—Continued.

BY WHOM DONE	MILES OF		Cubic Yards	Cost	Total Cost
	New Levee	Enlargement			
DRAINAGE WORK.					
Districts.....		Length Miles 1.11	Excavation Cubic Yards 33,600	\$ 4,955.00	\$ 4,955.00
TIMBER BULKHEAD.		Feet B.M. 195,744	Lin. Feet 2,449	\$ 45,143.66	\$ 45,143.66
Districts.....			Miles. 4.62	\$ 78,300.00 213,818.49	\$ 292,118.49
BANK PROTECTION.					
District.....					
United States.....					
Totals.....				\$ 292,118.49	\$ 292,118.49
WOODEN SHEET PILING.					
Districts.....			Lin. Feet 3,300	\$ 49,714.10	\$ 49,714.10
United States.....			15,687	35,943.85	85,657.95
Totals.....			18,987	\$ 85,657.95	\$ 85,657.95
				Grand Total....	\$ 6,767,961.77



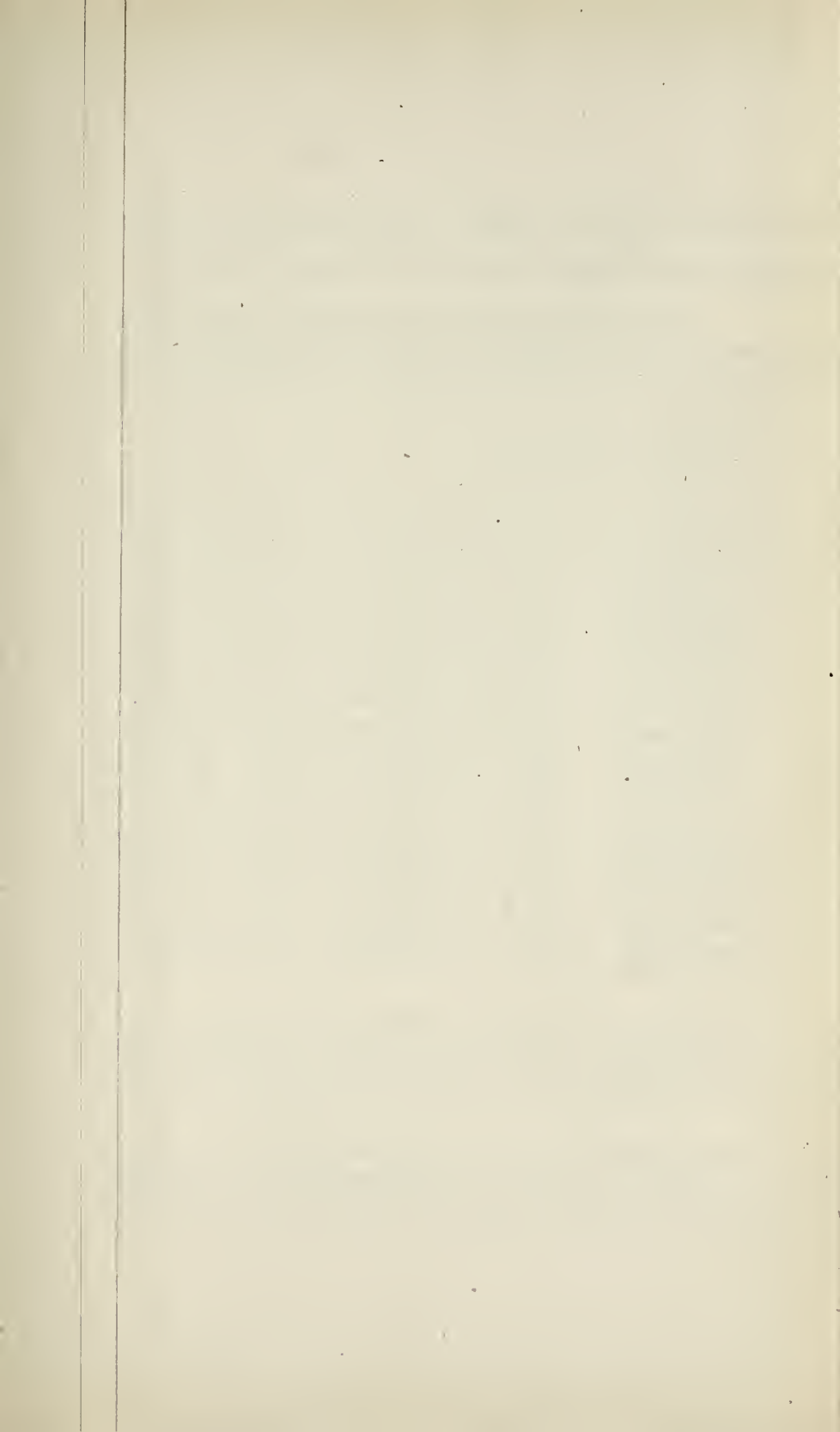
APPENDIX B.

STATEMENT RELATIVE TO HIGH WATER RECORDS

ALSO

MAP RELATIVE TO HIGHWAYS.

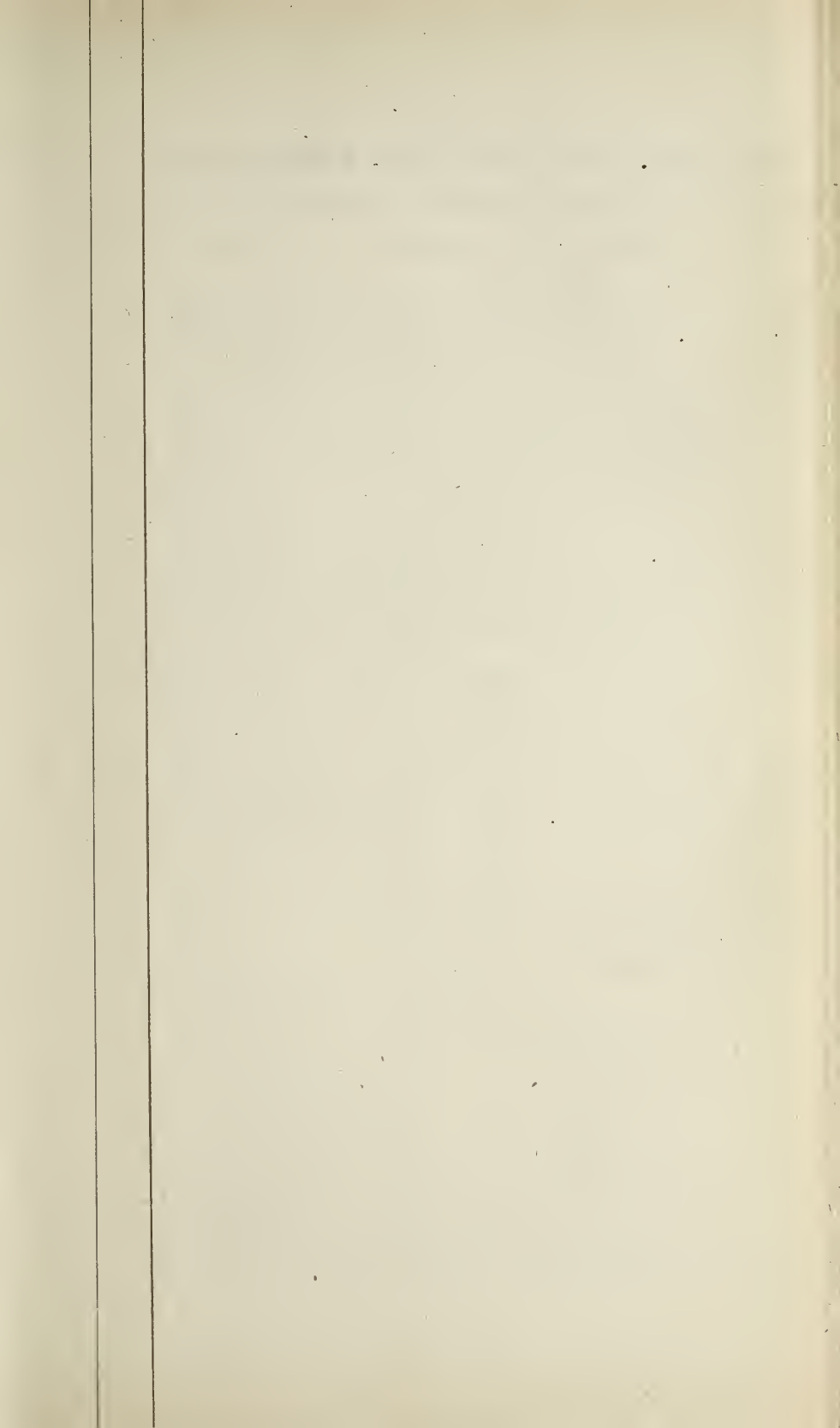




REVISED TABULATED STATEMENT OF DATES GAUGE READINGS AND ELEVATIONS "CAIRO DATUM," AT STATIONS GIVEN:
OF HIGHEST AND LOWEST WATERS DURING THE YEARS, 1912, 1913, AND 1914, (TO APRIL 20), COMPARED WITH
HIGHEST AND LOWEST WATER OF PREVIOUS RECORD.

NAME OF STATION	STREAM	ELEV. OF ZERO OF GAGE	HIGHEST WATER OF RECORD			HIGH WATER OF 1912			HIGH WATER OF 1913			HIGH WATER OF 1914 - TO APRIL 20TH. -			LOWEST WATER OF RECORD			LOW WATER OF 1912			LOW WATER OF 1913			LOW WATER OF 1914 - TO APRIL 20TH. -		
			Date	Gage Reading	Elevation Cairo Datum	Date	Gage Reading	Elev'n C. D.	Date	Gage Reading	Elev'n C. D.	Date	Gage Reading	Elev'n C. D.	Date	Gage Reading	Elevation Cairo Datum	Date	Gage Reading	Elev'n C. D.	Date	Gage Reading	Elev'n C. D.	Date	Gage Reading	Elev'n C. D.
Cairo, Ill.	Mississippi R.	290.84	Apr 5-8, 1913	54.70	345.54	Apr 6-7	53.94	344.78	Apr 5-8	54.70	345.54	Apr 11	41.30	332.14	Dec. 24, 1871	-1.00	289.84	Oct 17	9.43	300.27	Sept 29	6.60	297.44	Jan. 28	11.30	302.14
Memphis, Tenn.	"	203.97	Apr 9-13, 1913	46.10	250.07	Apr 6	45.23	249.20	Apr 9-13	46.10	250.07	Apr 14	32.90	236.87	Nov. 6-9, 1895	-2.65	201.32	Dec. 29	6.58	210.55	Oct. 2	4.80	208.77	Jan. 30	7.80	211.77
Helena, Ark.	"	161.98	Apr 22-23, 1913	55.20	217.18	Apr 22	54.30	216.28	Apr 22-23	55.20	217.18	Apr 17	39.50	201.48	Nov. 8-9, 1895	-3.00	158.98	Dec. 30	5.90	167.88	Oct. 4	2.30	164.28	Jan. 31	7.20	169.18
Arkansas City, Ark.	"	116.44	Apr 12, 1912	55.33	171.77	Apr 12	55.33	171.77	Apr 21-25	55.10	171.54	Apr 20	43.20	159.64	Nov. 9-10, 1895	-3.60	112.84	Dec. 10	7.80	124.24	Oct. 21	5.30	121.74	Feb. 2	10.80	127.24
Lake Providence, La.	"	89.62	Apr 12, 1912	48.25	137.87	Apr 12	48.25	137.87	Apr 21	48.00	137.62	Apr 20	36.20	125.82	Dec. 12, 1895	-5.30	84.32	Dec. 11	5.15	94.77	Oct. 21	3.00	92.62	Feb. 3	6.60	96.22
Vicksburg, Miss.	"	66.04	Apr 16, 1897	52.48	118.52	Apr 12	51.65	117.69	Apr 27-28	52.40	118.44	Apr 20	40.40	106.44	Nov. 13-14, 1895	-6.50	59.54	Dec. 10	5.47	71.51	Oct. 22	3.00	69.04	Feb. 4	7.40	73.44
Natchez, Miss.	"	36.89	Apr 26-27, 1913	52.40	89.29	Apr 13-17	51.42	88.31	Apr 26-27	52.40	89.29	Apr 20	41.50	78.39	Nov. 13-15, 1895	-0.85	36.04	Dec. 12	8.10	44.99	Sept. 19	7.00	43.89	Feb. 4	10.50	47.39
Red River Landg, La.	"	23.85	May 11-12, 1912	53.20	77.05	May 11, 12	53.20	77.05	May 8-10	50.60	74.45	Apr 20	40.60	64.45	Nov. 14, 1895	-0.60	23.25	Dec. 14	7.80	31.65	Sept. 11	6.00	29.85	Feb. 5	10.10	33.95
Bayou Sara, La.	"	23.95	May 11, 1912	47.37	71.32	May 11	47.37	71.32	May 9-11	44.50	68.45	Apr 20	33.40	57.35	Nov. 16, 1895	-2.80	21.15	Dec. 14	3.00	26.95	Sept. 12	3.60	27.55	Feb. 5	5.30	29.25
Baton Rouge, La.	"	20.06	May 11, 1912	43.82	63.88	May 11	43.82	63.88	May 9	41.30	61.36	Apr 20	31.20	51.26	Nov. 14, 1894	0.45	20.51	Oct. 26	4.80	24.86	Sept. 11	3.80	23.86	Feb. 5	6.70	26.76
Plaquemine, La.	"	21.06	May 11, 1912	39.38	60.44	May 11	39.38	60.44	May 7-11	36.80	57.86	Apr 20	27.14	48.20	Nov. 14, 1894	-0.94	20.12	Oct. 29	2.94	24.00	Sept. 21	2.44	23.50	Feb. 5	4.40	25.46
Donaldsonville, La.	"	19.19	May 10, 1912	35.10	54.29	May 10	35.10	54.29	May 8	32.80	51.99	Apr 20	24.20	43.39	Nov. 11, 1894	1.00	20.19	Dec. 14	3.20	22.39	Sept. 17	2.60	21.79	Feb. 5	4.50	23.69
Carrollton, La.	"	20.91	May 9, 1912	21.05	41.96	May 9	21.05	41.96	Apr 28	19.20	40.11	Apr 20	13.50	34.41	Dec. 27, 1872	-1.60	19.31	Nov. 24	1.05	21.96	Jan. 5	1.00	21.91	Feb. 6	1.50	22.41
New Orleans, La.	"	18.73	May 9, 1912	21.40	40.13	May 9	21.40	40.13	May 5-13	20.30	39.03	Apr 20	15.00	33.73	Dec. 27, 1872	0.20	18.53	Dec. 20	3.60	22.33	Jan. 3	3.50	22.23	Feb. 5	3.90	22.63
Port Jackson, La.	"	19.26	Feb 14-18, 1907	8.30	27.56	May 13, 11	8.28	27.54	Apr 23-27	8.30	27.56	Apr 20	6.30	25.56	Nov. 12, 1894 Dec. 7, 1893	0.30	19.56	Dec. 21	1.30	20.56	Jan. 8	1.80	21.06	Feb. 8	1.60	20.86
Fulton, Ark.	Red River	244.78	July 17, 1876	3575	280.53	Apr 6	30.62	275.40	May 24	23.90	268.68	Apr 14	31.30	276.08	Sept. 20-25, 1896	0.10	244.68	Dec. 1893	2.92	247.70	Sept. 5	1.80	246.58	Jan. 28	7.30	252.08
Shreveport, La.	"	161.27	May 28, 1892	35.70	196.97	Apr 14	19.30	180.57	May 25-27	12.40	173.67	Apr 10	23.30	184.57	Dec. 2-4, 1894	-5.50	155.77	Dec. 16-23	-4.20	157.07	Sept. 12	-4.80	156.47	Feb. 2	1.10	162.37
Alexandria, La.	"	64.46	July 6, 1908	41.82	106.28	Apr 21-22	33.56	98.02	Apr 6	24.20	88.66	Apr 15	34.60	99.06	Sept. 2-9, 1893	-3.70	60.76	Nov. 11-13	-0.72	63.74	Sept. 8	-1.30	63.16	Feb. 5	5.50	69.96
Barbours Landg, La.	Atchafalaya R.	24.17	May 10-15, 1912	53.35	77.52	May 10-15	53.35	77.52	May 10-11	50.20	74.37	Apr 20	39.70	63.87	Oct. 26, 1897	-1.77	22.40	Oct. 26	5.80	29.97	Sept. 12	4.30	28.47	Feb. 5	11.20	35.37
Melville, La.	"	20.17	May 6-15, 1912	41.73	61.90	May 6-15	41.73	61.90	Apr 24	41.70	61.87	Apr 20	36.50	56.67	Nov. 12-13, 1894	1.00	21.17	Oct. 27	8.27	28.44	Sept. 13	7.00	27.17	Feb. 6	12.70	32.87

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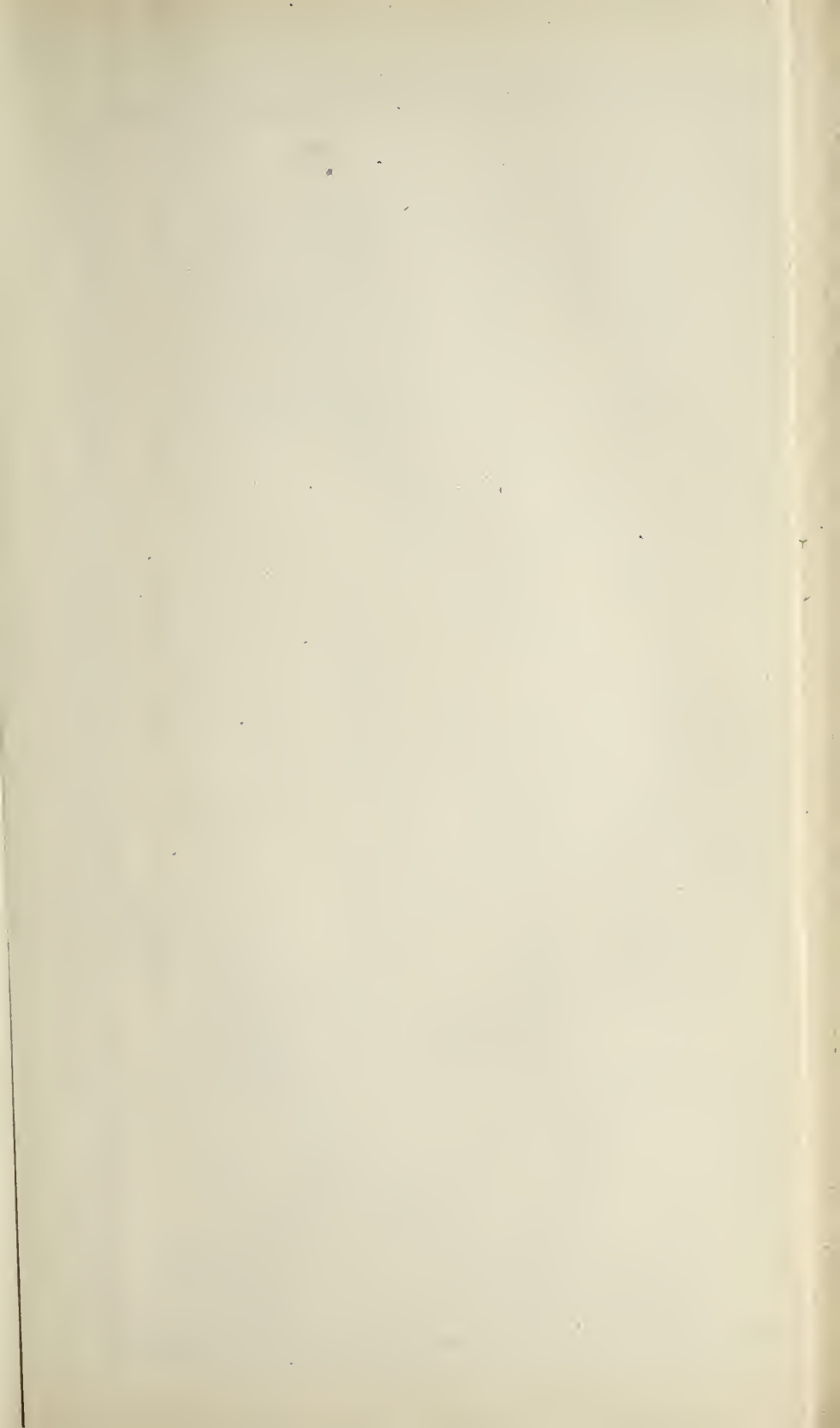
RECORD OF HIGHEST WATER FOR FLOOD YEARS, AT STATION INDICATED.

STREAM	NAME OF GAGE STATION.	1882	1883.	1884.	1892.	1897.	1898.	1903.	1907.	1908.	1912.	1913.	HIGHEST SINCE 1871.
Missouri	Omaha	14.50 June 28	14.20 June 28	15.90 April 6	15.30 July 3	17.10 April 6	14.70 July 3	14.40 June 1	17.30 July 18	19.10 July 3	18.50 April 14	18.70 April 7	23.60 1881
	Kansas City	19.20 July 3	28.30 June 28	17.20 July 5	24.90 May 21	27.80 April 17	21.50 June 12	35.00 June 12	23.50 July 20	30.20 June 15	23.10 April 2	21.90 April 16	35.00 1903
	St. Louis	32.15 July 4	34.80 Jan. 12	28.10 April 9	36.00 May 19	30.95 May 2	27.20 May 23	38.00 June 10	28.00 July 25	34.94 June 20	30.70 April 6	27.20 April 16	38.00 1903
Ohio	Pittsburg	21.00 Feb. 27	26.80 Feb. 10	31.80 Feb. 6	22.80 Jan. 15	28.90 Feb. 24	28.50 Mch. 24	28.80 Mch. 1	35.00 Mch. 15	26.70 Mch. 20	28.10 Mch. 22	34.00 Mch. 28	35.00 1907
	Cincinnati	58.58 Feb. 21	66.35 Feb. 15	71.06 Feb. 14	43.90 Apr. 25	61.10 Feb. 26	61.40 Mch. 24	53.30 Mch. 5	65.10 Jan. 21	55.70 Mch. 11	53.20 Mch. 27	69.80 Apr. 1	71.06 1884
	Louisville	37.40 Feb. 22	43.80 Feb. 16	46.60 Feb. 16	21.80 Apr. 23	35.30 Feb. 28	36.20 Mch. 30	28.50 Mch. 9	41.20 Jan. 22	31.10 Apr. 6	28.70 Mch. 28	45.10 April 2	46.60 1884
Cumberland Tennessee	Nashville	55.30 Jan. 22	41.60 Feb. 14	48.30 Mch. 15	38.80 Apr. 26	49.25 Mch. 20	38.80 Jan. 23	40.40 Mch. 9	28.20 Jan. 24	29.50 Feb. 16	46.50 April 8	44.90 April 2	55.30 1882
	Chattanooga	40.17 Jan. 19	38.17 Jan. 23	42.83 Mch. 10	37.90 Jan. 17	37.90 Mch. 15	24.60 Sept. 5	31.80 April 11	19.60 Jan. 2	24.70 Feb. 17	30.20 April 5	32.90 Mch. 31	54.00 1875
Mississippi	Cairo	51.87 Feb. 26	52.20 Feb. 27	51.79 Feb. 22	48.29 Apr. 28	51.67 Mch. 25	49.78 April 6	50.60 Mch. 13	50.30 Jan. 27	45.55 Mch. 19	53.94 Apr. 6	54.70 April 5	54.70 1913
	Memphis	35.15 Mch. 9	34.75 Mch. 6	34.15 Mch. 13	34.50 May 23	37.66 Mch. 20	37.59 April 10	40.10 Feb. 3	40.30 Feb. 3	35.55 Mch. 24	45.23 April 6	46.10 April 9	46.10 1913
	Helena	47.20 Mch. 9	46.90 Mch. 8	47.00 May 6	45.73 May 11	31.75 April 4	49.11 April 17	51.00 Mch. 26	50.40 Feb. 5	45.20 Mch. 26	54.30 April 22	55.20 Apr. 22	55.20 1913
	Mt. White River	48.40 Feb. 28	48.00 Mch. 9	47.90 Mch. 7	49.27 June 1	52.42 Mch. 29	51.05 April 19	53.70 Mch. 28	51.90 Feb. 7	49.50 June 1	56.35 Apr. 16	55.40 April 24	56.35 1912
Arkansas	Fort Smith	21.80 Feb. 23	22.80 June 11	27.90 Feb. 14	30.90 May 19	17.00 Mch. 20	35.00 May 7	24.10 May 26	18.80 Jan. 24	32.70 May 27	21.50 April 2	15.00 April 11	35.00 1898
	Little Rock	25.70 Feb. 25	25.80 Feb. 19	30.60 Feb. 15	31.20 May 21	23.20 Mch. 21	29.30 May 11	26.20 June 2	20.40 Jan. 25	27.80 May 30	24.00 May 4	18.80 April 13	31.20 1892
	Arkansas City	47.10 Feb. 28	46.35 Mch. 11	46.50 Mch. 7	50.00 June 1	51.90 Mch. 20	51.13 Apr. 19	52.90 Mch. 27	52.10 Feb. 8	49.90 June 23	55.33 Apr. 12	55.10 Apr. 21	55.33 1912
Mississippi	Greenville	41.68 Feb. 27	40.40 Mch. 9	41.10 Mch. 7	44.28 June 1	46.75 Mch. 29	46.16 April 21	49.10 Mch. 27	47.30 Feb. 9	44.75 June 3	50.76 April 12	50.45 April 21	50.76 1912
	Lake Providence	38.32 Mch. 20	36.47 Mch. 11	38.40 Mch. 23	41.90 June 2	44.54 Mch. 30	44.35 April 23	46.48 Mch. 27	46.30 Feb. 10	44.10 June 5	48.25 April 12	48.00 April 21	48.25 1912
	Vicksburg	48.75 Mch. 20	43.80 April 7	49.00 Mch. 25	48.45 June 2	52.48 April 16	49.40 April 24	51.80 Mch. 28	49.60 Feb. 10	47.80 June 5	51.65 April 12	52.40 April 28	52.48 1897
Red	Natchez	47.75 Mch. 28	44.00 April 7	47.40 Mch. 24	48.10 June 26	49.82 May 8	47.40 April 26	50.35 Apr. 23	48.90 June 14	48.70 June 14	51.42 Apr. 13	52.40 Apr. 26	52.40 1913
	Fulton			34.85 May 23	28.60 Mch. 23	27.90 May 11	31.15 Mch. 14	31.40 June 4	33.95 June 2	30.62 April 6	23.90 May 24	35.75 1876	
	Shreveport	31.40 Feb. 21	25.30 Mch. 11	32.70 May 14	35.70 May 28	24.10 Apr. 11	15.00 May 21	33.10 Mch. 24	26.90 June 13	35.10 June 15	19.30 April 14	12.40 May 26	35.70 1892
Atchafalaya	Alexandria	34.85 Mch. 17	25.45 Mch. 27	35.20 June 15	38.25 June 13	26.25 Apr. 14	17.40 Jan. 25	35.05 Mch. 28	32.60 June 18	41.82 June 6	33.56 April 21	24.20 April 6	41.82 1908
	Barber Landing	49.90 Mch. 27	46.30 Apr. 8	48.60 Mch. 30	49.70 May 27	50.95 May 13	42.35 May 2	50.50 April 7	45.70 Feb. 19	48.00 June 14	53.35 May 10	50.20 May 10	53.35 1912
	Melville	37.00		35.00 July 25	35.10 May 15	33.90 Apr. 29	38.70 April 4	37.70 Feb. 20	39.70 June 22	41.73 May 6	41.70 April 24	41.73 1912	
Mississippi	Red River Landg.	48.50 Mch. 27	45.20 April 9	47.30 Mch. 29	48.87 June 27	50.20 May 15	44.30 Apr. 28	50.08 April 8	46.90 Feb. 15	48.74 June 14	53.20 May 11	50.60 May 10	53.20 1912
	Baton Rouge	35.95 Mch. 26	35.08 April 9	36.20 Mch. 24	38.45 June 28	40.65 May 13	34.60 Apr. 29	40.05 Apr. 7	37.40 Feb. 17	39.60 June 17	43.82 May 11	41.30 May 9	43.82 1912
	Plaquemine	31.30 Mch. 27	30.80 April 9	31.70 Mch. 24	33.50 June 13	36.25 May 17	30.57 Apr. 29	36.12 Apr. 5	33.40 Feb. 17	35.20 June 4	39.38 May 11	36.80 May 7	39.38 1912
	Donaldsonville			25.70 Mch. 24	30.15 June 13	32.75 May 13	27.95 Apr. 28	32.23 April 7	30.00 Feb. 15	31.60 June 18	35.10 May 10	32.80 May 8	35.10 1912
	College Point	25.20 Mch. 26	23.45 April 9	24.10 Mch. 24	25.62 June 13	27.95 May 15	23.50 Apr. 27	27.81 April 5	25.90 Feb. 13	27.19 June 17	30.18 May 11	28.20 May 7	30.18 1912
	Carrollton	14.95 Mch. 27	15.40 April 7	15.60 Mch. 18	17.35 June 10	19.17 May 13	15.90 Apr. 25	19.42 April 5	18.70 Feb. 16	18.75 June 18	21.05 May 9	19.20 May 28	21.05 1912
	New Orleans	15.80 Mch. 27		16.20 Mch. 26	17.60 June 11	19.50 May 13	16.90 Apr. 19	20.30 April 7	19.80 Feb. 13	20.00 June 19	21.40 May 9	20.30 May 5	21.40 1912
	Fort Jackson			6.90 Mch. 31	7.20 Apr. 16	6.70 Apr. 23	8.05 Mch. 27	8.30 Feb. 14	8.10 Feb. 14	8.28 May 31	8.30 April 23	8.30 1907	

Compiled from publications of the Mississippi River Commission (Stages of the Mississippi River), and of the United States Weather Bureau.
Heavy type figures indicate water of record.

Office Board of State Engineers,
New Orleans, La., April 20th 1914.

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MAP
SHOWING SYSTEM OF PROPOSED
STATE HIGHWAYS
OF
LOUISIANA

AS ADOPTED BY
THE HIGHWAY DEPARTMENT
BOARD OF STATE ENGINEERS.

UNDER THE DIRECTION OF
STATE HIGHWAY ENGINEER W. E. ATKINSON.
1913



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